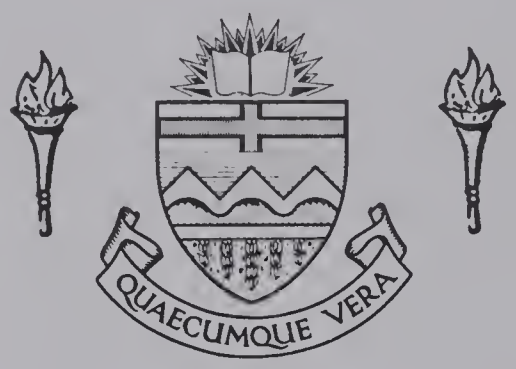

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Printing Department
Edmonton, Alberta

THE UNIVERSITY OF ALBERTA

CHARACTERISTICS OF FARM OPERATORS ASSOCIATED WITH ACCEPTANCE OF RECOMMENDED AGRICULTURAL PRACTICES IN THE BRETON LOAM REGION OF CENTRAL ALBERTA

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF SCIENCE

DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

EDMONTON, ALBERTA

SPRING 1971

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled "Characteristics of Farm Operators Associated With Acceptance of Recommended Agricultural Practices in the Breton Loam Region of Cental Alberta," submitted by James Wilson Loree in partial fulfilment of the requirements for the degree of Master of Science.

ABSTRACT

Rapidly increasing rates of technological change are forcing farmers to increase their rates of adoption of farming innovations if they are to remain competitive. This thesis is a study of 78 farmers in the Breton loam grey wooded soil region of Alberta. It attempts to determine the level of recommended farming practices followed by these farmers and to relate these levels of technology to selected economic and sociological characteristics of the operators.

Results obtained by linear regression analysis showed that 47.49 percent of the variation in the respondents' technology score was "explained" by variation in his attitude toward innovations, his attitude toward the use of credit, his attitude concerning the best source of ideas for his farm and whether or not he kept livestock on his farm.

Those respondents who were more prone toward adoption of innovations, had a more favorable attitude toward the use of credit, raised livestock on their farms, and named a more expert source for farming ideas, were also utilizing a greater proportion of the farm practice recommendations for the survey area.

Economic characteristics of farm size and total assets were also significantly related to the technology score; however, the attitude variables provided greater explanatory value in the regression equation.

Extension programs that would improve farmers' attitudes toward innovations or the use of credit would probably contribute to increased use of new technology by farmers.

ACKNOWLEDGEMENTS

I wish to express my appreciation to those who have provided assistance in the preparation of this manuscript. I gratefully acknowledge the financial support of the Alberta Agricultural Research Trust and the academic support of the Department of Agricultural Economics and Rural Sociology of the University of Alberta. Many thanks go to the farmers who gave their time and cooperation in providing the information on which this thesis is based.

The comments and suggestions of my supervisor, Professor T. A. Petersen, provided valuable direction and assistance in the preparation of this manuscript. I would also like to thank Mrs. S. Pisko, who typed this thesis.

In gratitude and love, I dedicate this thesis to my wife, Carol, for her sacrifices, understanding and encouragement.

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CHAPTER I

INTRODUCTION

Setting for the Study

Agricultural extension programs have been sponsored for a number of years by various levels of government throughout North America. The major portion of effort in Alberta has been provided by the provincial government through its agricultural extension branch. Extension programs have been supported in an attempt to encourage farmers to utilize "new" technology. It was reasoned that, through utilization of technology and management techniques, farmers would be able to farm more efficiently and thus improve their economic position.

In many cases, extension programs have been based on "a priori" reasoning. In fewer instances, research studies from other parts of the world provided a basis for program orientation. However, the application of extension techniques developed outside Alberta may not be germane to the situation in this province. Direction for extension programs in Alberta may be forthcoming from a study of Alberta farmers' characteristics and their relationship to the use of new technology.

The settlement of the Alberta prairies over the last 70 years has been accompanied by phenomenal changes in the agricultural sector of the economy. The rush of settlers

prior to 1910 resulted in the cultivation of large areas of virgin soil. While the process of settlement was still underway, the internal combustion engine was developed and introduced. This technological innovation rapidly replaced the "horse power" and steam engines previously utilized on Alberta farms.

Many other technological developments accompanied and followed the widespread adoption of the gasoline tractor. A number of the developments were direct results of research supported by provincial and federal governments. Extension agencies have worked to facilitate the transformation of research results into effective farming practices which are utilized to the benefit of farmers. The increasing pace of the discovery of new technology creates greater pressures for more rapid adoption of this technology.

Once a few farmers adopt a profitable innovation, economic pressures develop which force adoption on other farmers in order to maintain their relative positions on the economic ladder. Some of the benefits of innovations have been derived from the decreased necessity for physical work. These labor saving devices have increased labor effectiveness through the use of machines. Other innovations have resulted in decreased costs through increases in production efficiency. An increased rate of adoption of innovations can result in an improvement of the profitability of farming enterprises.

Technological developments and the pressures of competition have contributed to the trend toward larger farms with a decreasing proportion of the population employed in agriculture. Since fewer people are required for basic food production, labor and other resources can be diverted out of agriculture into production of other types of goods and services. This diversification of production has permitted an increase in the general standard of living and the economic growth of western Canada. Acceleration of the rate of adoption of new technology by farmers will contribute to continued economic growth in Canada.

Statement of the Problem

Why have some farmers been able to utilize technological developments to advantage? Why have others lagged behind and not kept up with the agricultural revolution?

This study is designed to examine and analyze selected characteristics of farm operators associated with various levels of use of new technology. The degree of the relationship of the characteristics to the level of technology used on the farm will also be estimated.

The rapid development of new technology in the twentieth century has created pressures for constant change in all sectors of the economy. The agricultural sector appears to have lagged behind the general pace of advancement, thus, it is now faced with obsolete technology.

In order to accelerate the adoption of new technology in the agricultural sector, more information on the reasons for farmer adoption or rejection of new technology is required.

Objectives and Hypotheses

The objective of this study is to identify the relative importance of some of the characteristics of farm operators that are related to increased use of technology on Alberta farms. Upon identification of some of the important characteristics, it should be possible to delineate specific areas through which extension personnel may work more effectively with farmers. By approaching the farmer through more effective methods, the extension worker attempts to influence the use of new technology and thus improve the farmer's efficiency and standard of living while at the same time contributing to Canadian economic growth.

In previous studies on adoption of technology, emphasis has usually been placed on either economic or social factors and their relationships to technological use and adoption. This project attempts to include economic and social factors in the same study. Economic and social characteristics of the farm operator are both related to his use of technology and, as such, cannot be separated.

The relevant characteristics can be grouped into several classes: (1) personal (age, health, etc.), (2) educational (formal and informal), (3) economic (net worth, farm size, etc.), (4) information contacts, and (5) attitudes.

It is the hypothesis of this study that variation in characteristics studied among farmers is related to variation in the levels of technology utilized by these farmers.

Assumptions, Boundaries, and Limitations

A number of assumptions must be made in order to facilitate the study of social and economic characteristics associated with a farmer's use of technology. The limitations of the project must be recognized.

A basic assumption is that it is possible to measure the characteristics and technologies under consideration. The validity of the project rests on the substantiation of this assumption.

Another basic assumption is that the technological practices studied are beneficial to the operation of the farm units. It is further assumed that the practices investigated represent a valid estimate of the level of technology utilized on the farm. Validation of these assumptions is provided since the technologies studied were selected from recommendations of the Alberta Department of Agriculture.[1]

Inasmuch as the data analyzed in this study were obtained randomly from a selected area of two counties in Alberta, the results, although valid for this area, should not be construed as representing a statistically sound analysis of the situation in Alberta or in Canada as a whole.

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[1]Alberta Department of Agriculture, Canada Department of Agriculture and University of Alberta, Alberta Farm Guide, (Edmonton: Alberta Department of Agriculture, 1967), pp. 24 - 216, passim.

At the same time, it is to be anticipated that the results will provide information on what one might expect in similar areas of the province.

Only a relatively small number of the many characteristics and factors involved in the use of technology were investigated in this project; however, those studied were selected from among the more important factors as reported in a number of previous research projects reviewed in the next chapter. Application of the results is limited by the unmeasured influences of deleted variables.

CHAPTER II

REVIEW OF LITERATURE

Prediction of Innovativeness

Prediction of human behavior is one of the goals of sociological theory. A common analytical procedure is to measure selected characteristics and then relate variation in these personal characteristics to variation in the behavior pattern. In the past, rural sociologists have used multiple correlation analysis to predict or explain innovativeness. Using this statistical technique, several "independent" variables (characteristics) are related to a "dependent" variable (innovativeness) in an effort to explain as much of the variation in the dependent variable as possible.

Multiple correlation analysis provides only an estimate of the proportion of variation explained. A closely related technique, multiple regression analysis, provides a concrete measure of the relationship between the variables in addition to the proportion of variation explained. The regression analysis is more adaptable to prediction of innovativeness in a different situation than is correlation analysis. Most previous studies have utilized the multiple correlation approach to explain variation in innovativeness.

In a study of Kansas cattlemen, Copp[1] utilized gross farm income, professionalism, and a mental flexibility score to explain 50 percent of the variation in innovativeness. Familism, information contact, level of living, and attitude toward innovations were used by Fliegel[2] to predict 32 percent of the innovativeness variation.

Studying Wisconsin dairymen, Copp[3] was able to explain 52 percent of the variation in an adoption index with gross farm income, membership in farm organizations, discerning ability, and, a weaker contributor, level of living. Rogers[4] used a conceptual variable analysis to study farmers in an Iowa county. He explained only 17 percent of the variation in innovativeness with attitude toward change, social status, and communication competence.

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[1] James H. Copp, Personal and Social Factors Associated With the Adoption of Recommended Farm Practices Among Cattlemen, Technical Bulletin 83 (Manhattan, Kansas: Kansas Agricultural Experiment Station, 1956), p. 25.

[2] Frederick C. Fliegel, "A Multiple Correlation Analysis of Factors Associated with Adoption of Farm Practices," Rural Sociology, 21 (1956), 284-292.

[3] James H. Copp, "Toward Generalization in Farm Practice Research," Rural Sociology, 23 (1958), 103-111.

[4] Everett M. Rogers, "A Conceptual Variable Analysis of Technological Change," Rural Sociology, 23 (1958) 136-145.

Using Kentucky counties rather than individual farmers as a base, Armstrong[1] achieved explanation of over 42 percent of the variation in farm innovation adoption scores. His independent variables were economic position of farmers, degree of urbanization, and farm specialization. Armstrong's study is not directly comparable to the other work, for the use of counties rather than individual farmers as a base eliminates much farmer to farmer variation, thus increasing the correlation coefficient.

Hobbs[2] was able to explain over 29 percent of the variation in innovativeness in agricultural chemical use on Iowa farms. His independent variables were attitude toward change agents, cosmopoliteness, brand awareness, knowledge about innovations, management vs. traditional work orientation, gross farm income, and farm size.

Sizer and Porter[3] explained over 25 percent of the variable in innovativeness with knowledge about innovations, social status, education, and social participation as independent variables.

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[1] Joseph B. Armstrong, "County Agent Activities and the Adoption of Soil-Building Practices" (unpublished M.S. thesis, Lexington, University of Kentucky, 1959), p.83.

[2] Daryl J. Hobbs, "Factors Related to the Use of Agricultural Chemicals on Iowa Farms" (unpublished M.S. thesis, Ames, Iowa State University, 1960), p.91.

[3] Leonard M. Sizer and Ward F. Porter, The Relation of Knowledge to Adoption of Recommended Practices, Bulletin 446 (Morgantown, West Virginia: West Virginia Agricultural Experiment Station, 1960), p.32.

Straus[1] utilized net worth, education, and wife role supportiveness to explain over 33 percent of innovativeness variation. Gross farm income, age, belief in agricultural magic, venturesomeness, and social status were used by Rogers and Havens[2] to explain over 56 percent of innovativeness variations. Cohen[3] utilized mobility (cosmopoliteness), individual values, and family income to explain almost 55 percent of innovativeness variation.

The use of multiple correlation procedures by researchers to explain innovativeness scores has met with varying degrees of success. As reported above, the levels of explained variation have ranged from 17 to 56 percent. Dissimilar methods and different definitions were utilized in the studies making exact comparisons difficult. However, the same basic approach was utilized by all the studies.

Copp presents evidence supporting generalization of adoption research beyond the specific projects. Comparison of the findings from the Kansas cattlemen and Wisconsin dairymen reported above indicates that when similar concepts,

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[1] Murray A. Straus, "Family Role Differentiation and Technological Change in Farming," Rural Sociology, 25 (1960). 119-223.

[2] Everett M. Rogers and A. Eugene Havens, (unpublished paper on predicting innovativeness with data from a statewide random sample of 104 farmers), Columbus, Ohio: Ohio Agricultural Experiment Station, 1961, cited by Everett M. Rogers, Diffusion of Innovations, (New York: The Free Press, 1962), p. 84.

[3] Reuben Cohen, "A Theoretical Model for Consumer Market Prediction," Sociological Inquiry, 32 (1962), 43-50.

measures and statistical techniques are used, the same variables may be important for explaining farm practice adoption behavior in different areas of the country and in different types of farm enterprises.[1]

The Adoption Process

The adoption or acceptance process is the series of mental steps or stages through which an individual passes from first hearing about a new idea to its final adoption.[2] The adoption process should be distinguished from the diffusion process. The diffusion process refers to the spread of a new idea from its source of invention or creation to its ultimate users or adopters. The diffusion process occurs among persons; adoption is an individual mental process.[3]

The adoption process by which an individual accepts a new idea and incorporates it into his activities has been broken down into stages. A number of research groups have postulated the stages concept; however, validation

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[1] James H. Copp, "Toward Generalization in Farm Practice Research," 103.

[2] Everett M. Rogers, Diffusion of Innovations, (New York: The Free Press, 1962), p. 76.

[3] Eugene A. Wilkening, "An Introductory Note on the Social Aspects of Practice Adoption," Rural Sociology, 23 (1958), 97.

of the concept was provided by both Beal, et al.[1] in a 1955 study of Iowa farmers and Copp, et al.[2] in a study of Pennsylvania dairy farmers reported in 1958. These researchers identified five stages in the adoption process: (1) awareness, (2) information, (3) application, (4) trial and (5) adoption.

In his book, Rogers[3] describes five comparable stages in the adoption process. His stages are: (1) awareness, (2) interest, (3) evaluation, (4) trial, and (5) adoption. An innovation may be rejected at any stage in the adoption process. A brief description of the type of behavior occuring during,and the main function fulfilled by each stage in the adoption process follows.

Awareness Stage--At this stage, "the individual is exposed to the innovation but lacks complete information about it."[4] The primary function of the awareness stage is to initiate the sequence of later stages that lead to the eventual adoption or rejection of the idea.

Interest stage--The individual now becomes interested in the idea and actively seeks more information.

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[1] George M. Beal, Everett M. Rogers, and Joe M. Bohlen, "Validity of the Concept of Stages in the Adoption Process," Rural Sociology, 22 (1957), 166-168.

[2] James H. Copp, Maurice L. Sill, and Emory J. Brown, "The Function of Information Sources in the Farm Practice Adoption Process," Rural Sociology, 23 (1958), 146-157.

[3] Everett M. Rogers, Diffusion of Innovations, p. 81.

[4] Ibid., p. 81.

He is purposive in his behavior. The function of this stage is to increase the individual's knowledge about the innovation.

Evaluation stage--During the evaluation stage "the individual mentally applies the new idea to his present and anticipated future situations and then decides"[1] to either try or reject the innovation. A "mental trial" occurs at this stage. If the individual feels the advantages of an innovation outweigh its disadvantages, he will decide to try it. The function of evaluation is the weighing of the situation and the decision to try or not to try the innovation.

Trial stage--At the trial stage, the individual uses the new practice on a small scale to validate its workability on his own farm. The main function of the trial stage is to "demonstrate the new idea in the individual's own situation and determine its usefulness for possible complete adoption".[2] It is thus a validity test or a "dry run". The individual may seek specific information about the method of using the innovation at the trial stage.

Adoption stage--At the adoption stage,"the individual decides to continue full use of the innovation".[3]

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[1] Ibid., p. 83.

[2] Ibid., p. 83.

[3] Ibid., p. 86.

The main functions of the adoption stage are consideration of trial results and the decision to ratify or reject continued use of the innovation. Adoption implies continued use until some better technique replaces the newly adopted innovation.

Adopter Categories

Adopter categories are the classifications of individuals within a social system on the basis of innovativeness. A wide variety of classification systems have been utilized in past research studies.

The writings of early sociologists, learning psychologists, and students of the interaction effect provide theoretical reason for expecting adopter distributions to be normal. The interaction effect is the process through which individuals in a social system who have adopted an innovation influence those who have not yet adopted. Psychologists' learning curves are normal and early sociologists observed that the adoption of new ideas tended to follow an S-shaped distribution.[1]

In a study of eight adopter distributions, Rogers concluded, "The distributions of both (1) single practices over time and (2) adoption of farm practices scores were found to be bell-shaped and approach normality."[2]

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[1] Ibid., pp.152-155.

[2] Everett M. Rogers, "Categorizing the Adopters of Agricultural Practices," Rural Sociology, 23 (1958), 354.

Four additional studies reported by Rogers also found that adopter distributions approached normality.[1] He utilized the normality of the innovativeness continuum to delineate five adopter categories: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards.[2] The categories are a somewhat arbitrary classification on the basis of the two parameters of the normal distribution, the mean and standard deviation. The development of adopter categories permits describing the characteristics of ideal types of individuals who are more or less likely to adopt a new idea. Following are brief descriptions of the sub-cultural values of each category and the description of the category using a time of adoption continuum as a base.[3]

Innovators--The first to adopt a new practice are the innovators. Individuals adopting earlier than the mean year of adoption minus two standard deviations ($\bar{x} - 2\sigma$) are innovators. They number about 1 in 40 or 2.5 percent. "Observers have noted that venturesomeness is almost an obsession with innovators. They are eager to try new ideas."[4] An innovator desires the hazardous, the rash, the daring, and the risking. He must also be willing to accept the occasional debacle when one of the new ideas he adopts proves unsuccessful.

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[1] Everett M. Rogers, Diffusion of Innovations, p. 158.

[2] Everett M. Rogers, "Categorizing the Adopters of Agricultural Practices," 350-351.

[3] Everett M. Rogers, Diffusion of Innovations, pp. 161-171.

[4] Ibid., p. 169.

Early adopters--Those in the second category to adopt are called early adopters. About 1 in 8 farmers (13.5 percent) fall into this category between the mean minus 2 standard deviations ($\bar{x} - 2\sigma$) and the mean minus 1 standard deviation ($\bar{x} - \sigma$). This adopter category has the greatest degree of opinion leadership in the social system. The early adopter is not"too far" ahead of the average individual in innovativeness. "He is considered by many to be 'the man to check with' before using a new idea. The early adopter is respected by his peers. He is the embodiment of successful and discrete use of new ideas."[1]

Early majority--The third category of farmers is called the early majority. This category contains about 1 in 3 farmers (34 percent) and is between the mean ($\bar{x}$) and the mean minus 1 standard deviation ($\bar{x} - \sigma$). The early majority adopt new ideas just before the average member of the social system. The position of the early majority between the very early and the relatively later adopters makes them an important link in the legitimizing process. They participate in activities with peers but rarely hold leadership positions. The early majority follows "with deliberate willingness in adopting innovations but seldom lead."[2]

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[1] Ibid., p. 169.

[2] Ibid., p. 170.

Late majority--The category which adopts innovations just after the average member of a social system is the late majority. About 1 in 3 (34 percent) of the adopters also fall into this category between the mean ($\bar{x}$) and the mean plus 1 standard deviation. ($\bar{x} + \sigma$) Adoption of a practice by a member of the late majority may be both an economic necessity and the answer to increasing social pressures. The late majority tends to be skeptical of new ideas. "The weight of public opinion must definitely favor the innovation before the late majority are convinced. They can be convinced of the utility of a new idea but the pressure of peers is necessary to motivate adoption."[1]

Laggards--The laggards are the last farmers to adopt an innovation. They possess almost no opinion leadership and their point of reference is the past. Approximately 1 farmer in 6 (16 percent) or those adopting later than the mean plus one standard deviation ($\bar{x} + \sigma$) can be classified as a laggard. By the time laggards adopt an idea, it may already be superseded by another more recent idea which the innovators are using. "Alienation from a too-fast-moving world is apparent in much of the laggards outlook. While most individuals in a social system are looking to the road of change ahead, the laggard has his attention fixed on the rear-view mirror."[2]

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[1] Ibid., p. 171.

[2] Ibid., p. 171.

Characteristics of Adopter Categories

Many research reports include a description of the characteristics of adopter categories. In his book, Rogers[1] reviews and distils the findings of a number[2] of research studies into a manageable section. Some difficulty is encountered in comparing the various studies because different definitions and procedures were utilized, however, most researchers used some measure of innovativeness and related this measure to generally similar variables. Research findings on the characteristics of adopter categories are summarized under the following headings: (1) personal characteristics, (2) communication behavior, and (3) social relationships.

Personal Characteristics

Age--In general, earlier adopters are younger in age than later adopters. This relationship between age and innovativenss does not have unanimous support from the projects considered. Rogers lists ten research studies which reported a significant relationship between younger age and increased innovativeness. Another ten research studies found no significant relationship between age and innovativeness. Three other studies reported older age to be associated with innovativeness.[3]

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[1] Ibid., pp. 171-192.

[2] There are over 60 studies reporting characteristics of adopter categories.

[2] Ibid., p. 172.

There may be an explanation for the inconsistencies in the results of the reported studies. The projects considered age at time of interview and not at time of adoption of the innovations. A reanalysis of Gross'[1] original data provides some insight. There are wider differences in age between adopter categories when age at time of adoption is considered than when age at time of interview is considered. The average age of the earliest adopters at time of interview was 48.2 years; at time of adoption, it was 37.2 years. The latest acceptors average 59.0 years at time of interview and 58.0 years at time of adoption.[2] The difference between the age ranges for the two methods of evaluation implies that the younger operators adopt earlier and the older operators adopted later.

General evidence indicates that earlier adopters are relatively younger than later adopters. Theoretical evidence can be marshalled in support of this generalization. Socialization of personality occurs mainly in early life. Thus, in a rapidly changing culture younger people learn a relatively more modern set of cultural values. The older individuals were socialized in an earlier era. The young are less conditioned by the older culture; hence, they are more innovative.[3]

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[1] Ibid., p. 173.

[2] Ibid., p. 173.

[3] Ibid., p. 174.

The theoretical evidence in support of the relation of age to innovativeness results in sound conclusions. The empirical deviance from the theoretical expectation may be the result of influences of other characteristics neutralizing the effect of age. It may also result from the measurement of age at interview, rather than of age at adoption as reported above.

Financial position--The generalization can be made that earlier adopters have a more favourable financial position than later adopters.[1] Affluence may be measured by a high income, by a large-sized operation, or by possession of wealth.

The characteristics of innovators and laggards in the petroleum industry were studied by Enos. He concluded: "A prosperous refiner is the innovator; an impoverished one is the laggard."[2] Mansfield supported this statement with his study of 5000 steel, petroleum and coal firms. He reported that size of firm varied directly with innovativeness.[3]

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[1] Ibid., p. 175.

[2] John L. Enos, "A Measure of the Rate of Technological Progress in the Petroleum Refining Industry," quoted by Everett M. Rogers, Diffusion of Innovations, p. 175.

[3] Edwin Mansfield, Innovations, Size of Firm and Market Structure, cited by Everett M. Rogers, Diffusion of Innovations, p. 175.

Rogers reported that higher gross farm income was more characteristic of innovators than later adopters.[1] Rogers also states that this relationship between innovativeness and financial position has been reported by at least 18 other studies.[2]

While wealth and innovativeness go hand-in-hand, the question arises as to which is cause and which is effect. Do innovators adopt because they are wealthy or are they wealthy because they innovate? The answer to this question is not easy to provide.

There is an adequate theoretical base explaining why wealth and innovativeness should be related. The first innovators to adopt profitable innovations are able to reap the greatest profits from the idea. Later adopters are forced to employ the innovation after it has been utilized by large numbers of other operators. Adoption is forced on the laggard in a struggle for economic survival because of the competition provided by earlier adopters as a result of inelastic demand, etc.

Some new ideas are costly to adopt and require large initial outlays of capital. Only the wealthy units

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[1] Everett M. Rogers, Characteristics of Agricultural Innovators and Other Adopter Categories, cited by Everett M. Rogers, Diffusion of Innovations, p. 176.

[2] Everett M. Rogers, Diffusion of Innovations, p. 176.

may be able to afford adoption of the innovation, thus only the wealthy are able to reap the financial advantages. Through this process, it is hypothesized that the rich innovators become richer and the poor laggards become poorer.

An innovator is not always certain of the profitability of a new idea when he adopts it. It is to be expected that some new ideas are found to be unprofitable after their adoption. The innovator of a new idea may suffer a substantial financial loss if he adopts an unprofitable practice. He must assume a risk that the innovation he is adopting is profitable. Later adopters of proven innovations do not have to assume this risk. A wealthy operator can better withstand a loss from an unprofitable innovation. A loss may place him in a tight situation while a similar loss would cripple a less wealthy operator. The risk factor of innovations may provide part of the explanation for the relationship between innovativeness and wealth of operators.

The answer to the cause and effect question of wealth and innovativeness has not been answered from the research available. Economic factors alone do not completely explain innovative behavior; witness the many wealthy farmers who are not innovators. More intensive psychological research is needed to determine the relationship between wealth and innovativeness.

Specialization--Earlier adopters tend to have more specialized operations than later adopters. Innovators tend to be specialized and "place all their eggs in one basket".

Usually, farmer innovators concentrate on one enterprise such as hogs, beef, or grain.[1] The innovator is able to keep up to date on developments in his specialty more easily than attempting to keep abreast of developments in a number of enterprises. The specialized operator also tends to seek more cosmopolite sources of information.

The empirical support for the relationship between innovativeness and specialization is not as conclusive as the support for age and financial position. Rogers, Jones, and Rogers and Burdge report that innovativeness varied directly with specialization.[2] The characteristic of operator specialization related to innovativeness has not been as widely considered as have a number of other characteristics.

Social status--Earlier adopters tend to have higher social status than do later adopters. The exact relationship between status and innovativeness may depend, in part, on the characteristics of the innovation. Social class values attached to the innovation may affect its rate of adoption by individuals of different social classes.

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[1] Everett M. Rogers, Characteristics of Agricultural Innovators and Other Adopter Categories, cited by Everett M. Rogers, Diffusion of Innovations, p. 177.

[2] Everett M. Rogers, Characteristics of Agricultural Innovators and Other Adopter Categories, cited by Everett M. Rogers, Diffusion of Innovations, p. 177. Gwyn E. Jones, Factors Affecting the Adoption of New Farm Practices, with Particular Reference to Central Wales and the East Midlands of England, cited by Everett M. Rogers, Diffusion of Innovations, p. 177. Everett M. Rogers and Rabel J. Burdge, Community Norms, Opinion Leadership and Innovativeness Among Truck Growers, cited by Everett M. Rogers, Diffusion of Innovations, p. 177.

Direct variation between social status indexes and innovativeness has been reported in 18 separate research studies.[1] Each of these also reported education (one dimension of social status), as varying directly with innovativeness. A similar relationship was reported by seven other studies which did not consider social status directly.[2] The innovators and early adopters generally have higher social status and more education than later adopters.

Mental ability--Early adopters tend to have a mental ability which is different from that of later adopters. Innovators must be able to adopt innovations utilizying the mass media as a major source of information. They cannot utilize the information and experiences of the majority of members of their social system because the majority has not adopted the idea.[3]

Fragmentary evidence in support of this generalization has been provided by several research studies. The relationship between innovativeness and "cloze" scores (a crude measure of intelligence) were reported to be low but positive by Rogers and van den Ban.[4] The ability

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[1] Everett M. Rogers, Diffusion of Innovations, p. 174.

[2] Ibid., p. 174.

[3] Ibid., p. 177.

[4] Everett M. Rogers, Characteristics of Agricultural Innovators and Other Adopter Categories, cited by Everett M. Rogers, Diffusion of Innovations, p. 177. A.W. van den Ban, Boer en landvoorlichting: De communicatie over nieuwe landownmethoden, cited by Everett M. Rogers, Diffusion of Innovations, p. 177.

to deal with abstractions was found to be highly related to innovativeness in a study by Rogers and Beal.[1] Several other studies reported that farm innovators have greater knowledge of technical agriculture than do laggards.[2]

A number of investigations have reported that earlier adopters are less dogmatic and rigid than later adopters. Rogers reported that the more innovative a farmer, the more likely he was to score lower on a dogmatism and rigidity scale.[3] In a study of Kansas cattlemen, Copp found that innovators had greater mental flexibility than laggards.[4] Rogers lists four other studies which reported that innovators utilized more rational means to reach goals than did laggards.[5] Four other studies concluded that laggards were relatively more work oriented than innovators.[6] Laggards tended to view work as a goal in itself, rather than a means to other ends.

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[1] Everett M. Rogers and George M. Beal, "Projective Techniques and Rural Respondents," cited by Everett M. Rogers, Diffusion of Innovations, p. 177.

[2] Everett M. Rogers, Diffusion of Innovations, p. 177.

[3] Everett M. Rogers, "Personality Correlates of the Adoption of Technological Practices," Rural Sociology, 22 (1957), 267-268.

[4] James H. Copp, Personal and Social Factors Associated With the Adoption of Recommmended Farm Practices Among Cattlemen, cited by Everett M. Rogers, Diffusion of Innovations, p. 178.

[5] Everett M. Rogers, Diffusion of Innovations, p. 178.

[6] Ibid., p. 178.

The data supporting the generalization of the relation of mental ability to innovativeness is extremely weak. The weak relationships may result from the difficulty in measuring and evaluating the dimension of mental ability. Further investigation is needed to substantiate the generalization that innovators have different mental ability than later adopters.

Communication Behavior

The sources of information utilized by adopters of innovations depend on: (1) stage in the adoption process, (2) characteristics of the innovation, and (3) adopter category.

Impersonal sources--Impersonal sources of information are more important for earlier adopters of innovations than for later adopters. This tendency is particularly apparent at the adoption stage and is slightly less important at other stages. Rogers lists seven studies which support the generalization that later adopters require more personal influence to provide motivation than do earlier adopters.[1]

Cosmopolite sources--Cosmopolite sources of information are more important than localite sources for the earlier adopters of innovations. Innovators are more likely to seek and utilize information sources outside

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[1] Everett M. Rogers, Diffusion of Innovations, p. 179.

their local social system, probably in order to seek out more expert sources of information. Localite sources are more important for later adopters. Support for this generalization is provided by three studies cited by Rogers.[1]

Contact with origins of ideas--Earlier adopters are in closer contact with the origins of new ideas than are later adopters. Innovators have more direct contact with scientists and scientific research than later adopters. This generalization has been supported by six research studies.[2] Two other studies report that innovators have a more favourable attitude toward scientists than do laggards.[3]

Rogers reports that innovators had a greater degree of contact with scientists than did other adopter categories.[4] The early adopters had the greatest contact with county extension agents, exceeding the innovators' extension agent contacts.

Number of sources-- Earlier adopters utilize a greater number of information sources than do later adopters. Earlier adopters tend to actively seek information sources. Later adopters tend to have a more passive or even negative

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[1] Ibid., p. 181.

[2] Ibid., p. 181.

[3] Ibid., p. 181.

[4] Everett M. Rogers, Characteristics of Agricultural Innovators and Other Adopter Categories, cited by Everett M. Rogers, Diffusion of Innovations, p. 181.

attitude toward new approaches. In order to secure more complete information about innovations, earlier adopters tend to be willing to expend greater amounts of time and effort than are later adopters.[1]

Innovators tend to utilize more impersonal, more cosmopolite, more direct, and a greater number of information sources than do later adopters. A general summary statement is provided by the proposed two-step diffusion process for technological information: "Technological farming ideas often flow from the impersonal sources to the earlier adopters and, from them, as personal communication to the later adopters."[2]

Social Relationships

Cosmopoliteness--"Cosmopoliteness is the degree to which an individual's orientation is external to his particular social system."[3] It was reported above that innovators use more cosmopolite sources of information than do later adopters. The reference groups of innovators are more likely to be outside rather than within their social system.

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[1] Everett M. Rogers, Diffusion of Innovations, p. 182.

[2] George M. Beal and Everett M. Rogers, The Adoption of Two Farm Practices in a Central Iowa Community, Special Report No. 26 (Ames, Iowa: Agricultural and Home Economics Experiment Station, Iowa State University of Science and Technology, June, 1960), p. 20.

[3] Everett M. Rogers, Diffusion of Innovations, p. 183.

Innovators are interested in affairs outside their social system and travel widely. The cliques and formal organizations to which innovators belong are likely also to include other innovators as members. These conclusions were summarized from 12 studies reported by Rogers.[1]

Opinion leadership--Earlier adopters exhibit more opinion leadership than later adopters. Strong evidence in support of this generalization is provided by 17 research studies.[2] An individual who is more innovative than his peers is in a position to influence their adoption decisions. He has had prior experience with the innovation and the questions they are asking. In some cases, the potential influence is limited by other factors such as norms of the social system.

The innovator seeks information from outside the social system and serves as the opinion leader in introducing the technique to his social system.

Consistency of Innovativeness

There is no clear-cut evidence as to whether or not innovative behavior is completely consistent.[3] It is doubtful that an individual who is an innovator for one idea would be a laggard for another idea.

In his sample of Australian farmers, Parish found

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[1] Ibid., p. 183.

[2] Ibid., p. 184.

[3] Ibid., p. 187.

a generally consistent adoption pattern for farm innovations.[1] Farmers who had adopted soil conservation ideas also had adopted livestock feeding ideas and crop innovations. Thus, there is a tendency for farmers to consistently adopt or reject farm innovations.

There is some question as to whether farm practice innovators are also innovators in consumer behavior, political ideology, or other areas of life. Most research studies tend not to report on consistency of innovativeness.

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[1] Ross Parish, "Innovations and Enterprise in Wheat Farming," cited by Everett M. Rogers, Diffusion of Innovations, p. 187.

CHAPTER III

METHODOLOGY

The Sample Area

The desired procedure in a research project to determine relationships among variables is to hold as many factors as possible constant while varying selected characteristics. A similar soil type for farm operators in the sample would reduce the effects of land type on the advantages of technology.

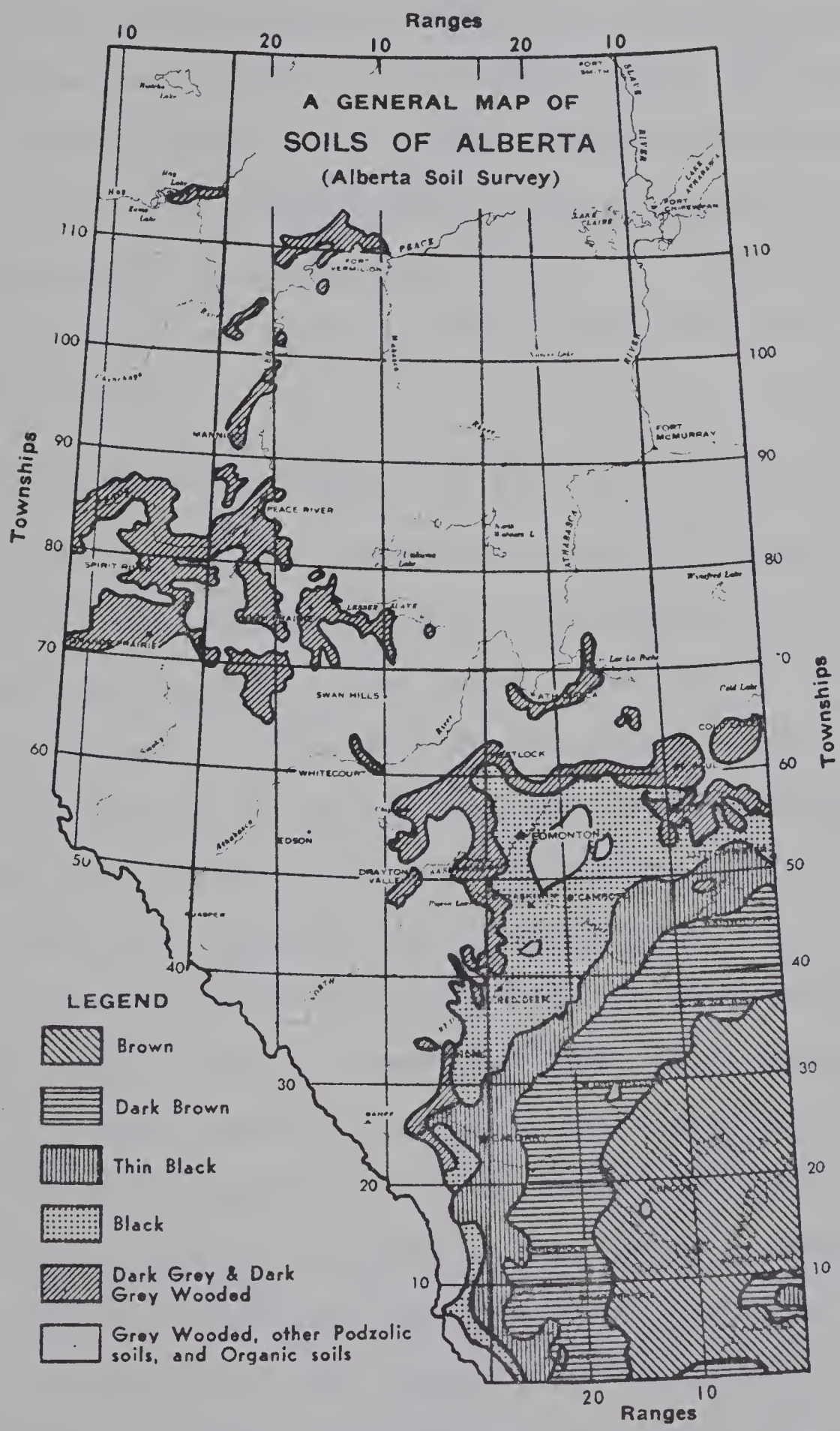
It was also deemed advantageous to select an area of Alberta where farming technology was important in achieving a viable farming operation. It was postulated that in the grey wooded soil zone, soil management technology is an important factor contributing to the success of the farm firm. Recommended practices of soil management such as fertilization, soil testing, and crop rotation are important in farm operations on grey wooded soil.

The soil type selected for the sample area was Breton Loam in the grey wooded zone. Although the grey wooded soil zone is the largest soil zone in the province of Alberta, it does not contain the largest cultivated area. The soils of Alberta are represented in Figure 1.

On a soil survey map delineating the soil types

Figure 1

SOIL ZONES OF ALBERTA



Source: Alberta Department of Agriculture, Canada Department of Agriculture, and the University of Alberta, Alberta Farm Guide, (Edmonton: Extension Service, 1967), p. 19.

within the grey wooded zone, an area southwest of Edmonton with a high proportion of Breton Loam in the surface was outlined. The constant soil type area was transferred to a section map to delineate the area for investigation. Figure 2 shows an outline of the sample area. The area outlined for the sample was approximately 280 square miles. The survey area was transferred to county landowner maps which represented farmstead locations. The selected survey area contained 145 sections in Leduc County and 135 in Wetaskiwin County.

Selection of the Sample and Data Collection

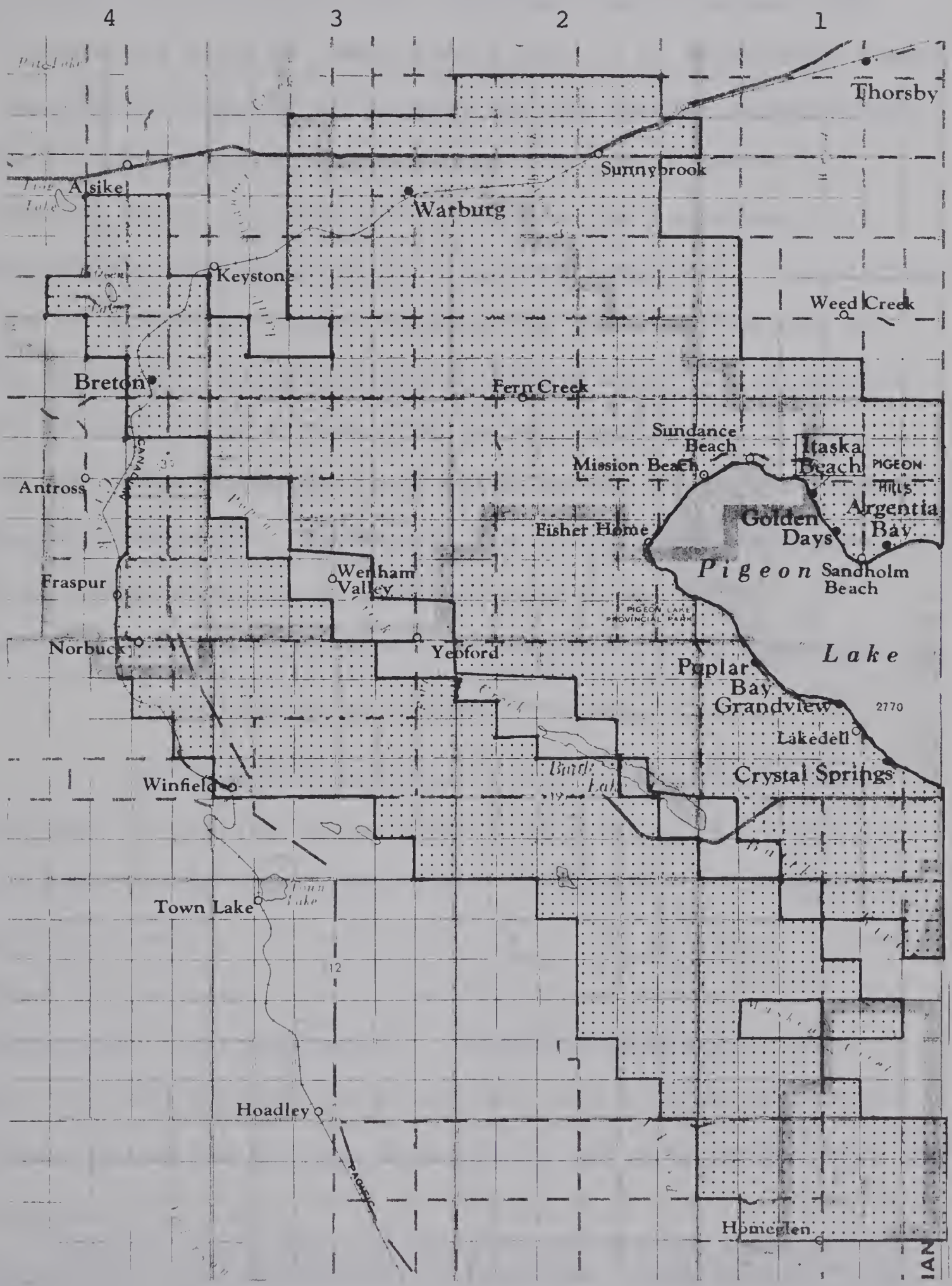
County maps of Leduc and Wetaskiwin counties were obtained from the county offices. The Leduc map was printed with farmstead locations represented. Wetaskiwin farmstead locations were obtained from 1968 assessment files. There were 235 farmsteads on the 145 sections in Leduc County and 138 on the 135 sections in Wetaskiwin County. Thus, the sample population consisted of 373 farmsteads.

Sixty-three percent (235) of the population was located in Leduc County, 37 percent (138) in Wetaskiwin County. A random sample of 60 farms (25.5 percent) was selected from the population of 235 in Leduc County by a random sampling computer program. Similarly, a sample of 40 farms (28.9 percent) was selected from the population of 138 in Wetaskiwin. The overall sampling proportion was 26.8 percent, resulting in a sample of 100 from the population

Figure 2

SURVEY AREA ON BRETON LOAM SOIL

RANGE (WEST OF FIFTH MERIDIAN)



Source: Alberta Department of Lands and Forests, Provincial Access Series, (Edmonton: Alberta Department of Lands and Forests, Technical Division, 1968), Sheet No. 83 G/B

of 373 farmsteads in the study area.

Seventy-eight personal interviews with the farm operators on the farms were completed during August 1968. Of these, 42 were in Leduc County and 36 in Wetaskiwin County for a completion rate of 70 percent and 90 percent respectively. The 22 incomplete interviews were the result either of refusals or of an inability to locate the farmstead or to contact the residents of the selected farmstead. The difference in completion rates between the two counties may be the result of the age of the farmstead location information. The Wetaskiwin data came from current assessment files, but the Leduc locations were cited on the map by printers several years ago. Several of the Leduc farmsteads have since been abandoned or combined with other farms, thus reducing the number of potential respondents in the area.

Development of Technology Score

Management practices of the farm operator were selected to provide an estimate of the level of technology utilized in the farm operations. Criteria for inclusion of practices were: (1) applicability of the practices to most farms in the area; (2) representation of several types of technology (soil management, livestock management, etc.); (3) measurability of the practices; and (4) recommendation of the practices for use on farms in the grey wooded soil zone.[1]

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[1] Alberta Department of Agriculture, Canada Department of Agriculture, and University of Alberta, Alberta Farm Guide, pp. 24-216, passim.

The management practices studied fall into several classes: (1) soil management, (2) chemical controls, (3) livestock management, and (4) record keeping. The practices considered in soil management were rate of fertilizer application, use of soil testing, and crop rotation plans. Chemical controls were weed and wild oat sprays. Record keeping was rated as to the completeness of records of the farming operations from cash transaction records alone to records of livestock weight gains and feed efficiencies. Livestock management included nutritional elements of technology (feed testing, protein supplement, and Vitamin A concentrate), crossbreeding, and use of a systemic insecticide. Management practices were so selected as to represent the technology utilized on the farm.

A farm operator utilizing all of the recommended practices applicable to his operation was assigned a perfect score, or 100 percent. An operator using none of the recommended practices was assigned a zero or nil score. Partial application of the recommendations resulted in scores assigned on a basis proportionate to the level and number of practices utilized. A detailed discussion of technology score development is presented in Appendix I.

Characteristics of the Farm Operators

Characteristics of the farm operators to be studied were selected from among the characteristics judged relevant in previous diffusion research. Some questions,

such as age and farming experience, could be answered directly; others required open-ended response. Responses to the open-ended questions were combined into comparable groups to facilitate analysis.

The characteristics of the farm operators studied were grouped into several classes: (1) personal, (2) educational, (3) economic, (4) information contacts, and (5) attitudes. In some cases information on the operator's wife was also gathered.

Personal factors included in the questionnaire were age, marital status, husband and wife's ethnic backgrounds, family size (number of children), and health of the operator. Also included were parents' occupations and farming and other work experience. If the operator was raised on a farm, the location of this farm was obtained. In the education section, achievements of both husband and wife were included. Questions were asked regarding the last grade of school completed, other training, and the location of that training. Economic factors collected were net worth, farm size, land tenure, and income. Two measures of income were included. They were gross income and reinvestment income. Information contacts included mass media, the district agriculturist, and other extension contacts. Also included was a community participation scale. Questions regarding the farm operators attitudes toward change, credit, education, and risk were asked in the

attitude section. Farmer attitudes concerning innovation proneness, rural life preference, primary group preference, and economic motivation were evaluated using the Straus Rural Attitudes Profile.[1]

This profile uses a forced-choice technique to measure the four attitudes of the respondent. The format consists of twelve groups of four statements each called tetrads. Each of the variables to be measured is represented by one statement in each tetrad. The respondent is asked to select from each tetrad one statement that is most like himself and one that is least like himself, Thus, the respondent is "forced" to make rankings within the tetrad because he cannot, as in most usual "yes-no" response tests, say "yes" to socially desirable statements and "no" to undesirable ones. The context of selection is specified, thus, all respondents have the same base for their evaluations. The forced-choice format seems to provide a measurement instrument that is difficult to fake and that appears to provide a valid measurement of the attitudes.

Treatment of the Data

The replies to the questions in the interview schedule were coded for computer analysis. Wherever possible, the respondent's reply was utilized directly. For example, the rate of fertilizer application was transferred directly to the computing system. Coding of open-

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[1] Murray A. Straus, A Technique for Measuring Values in Rural Life, Technical Bulletin 29 (Pullman, Washington State College of Washington, Washington Agricultural Experiment Station, August 1959), pp. 28-29.

ended questions was more complex. All the replies to a question were first listed as the respondents had stated them. Secondly, the replies were grouped into similar expressions and then ranked from one extreme of opinion to the other which were represented by the replies. Numerical scores were assigned to each respondent which corresponded to his position in the ranked classification. The data was then transferred to computer punch cards and read onto tape for storage. It was listed out and errors corrected. All the data was then entered through an A.P.L. terminal and stored in the A.P.L. system for analysis.

CHAPTER IV

ANALYSIS OF THE DATA

Technology Levels of Sample Farms

An obvious conclusion drawn from a preliminary survey of the questionnaires was that the sample farms exhibited wide variation in the levels of technology utilization. This conclusion was substantiated by detailed analysis. Scores were calculated for fertilizer application rates, crop rotation, livestock management, and a composite score including soil testing, chemical controls, and record keeping. The method of score calculation is presented in Appendix I.

Grain fertilizer score

The scores for fertilizer application on grain crops ranged from 0 to 100 percent on a scale where 0 represents no fertilizer use and 100 percent signifies exact compliance with recommendations.[1] The distribution (Figure 3) is slightly skewed towards the higher scores. The mean score is 33.58 percent and the standard deviation is 25.13 percent.

Hay fertilizer score

The scores for application of fertilizer on hay ranged from 0 to 100 percent also. The distribution

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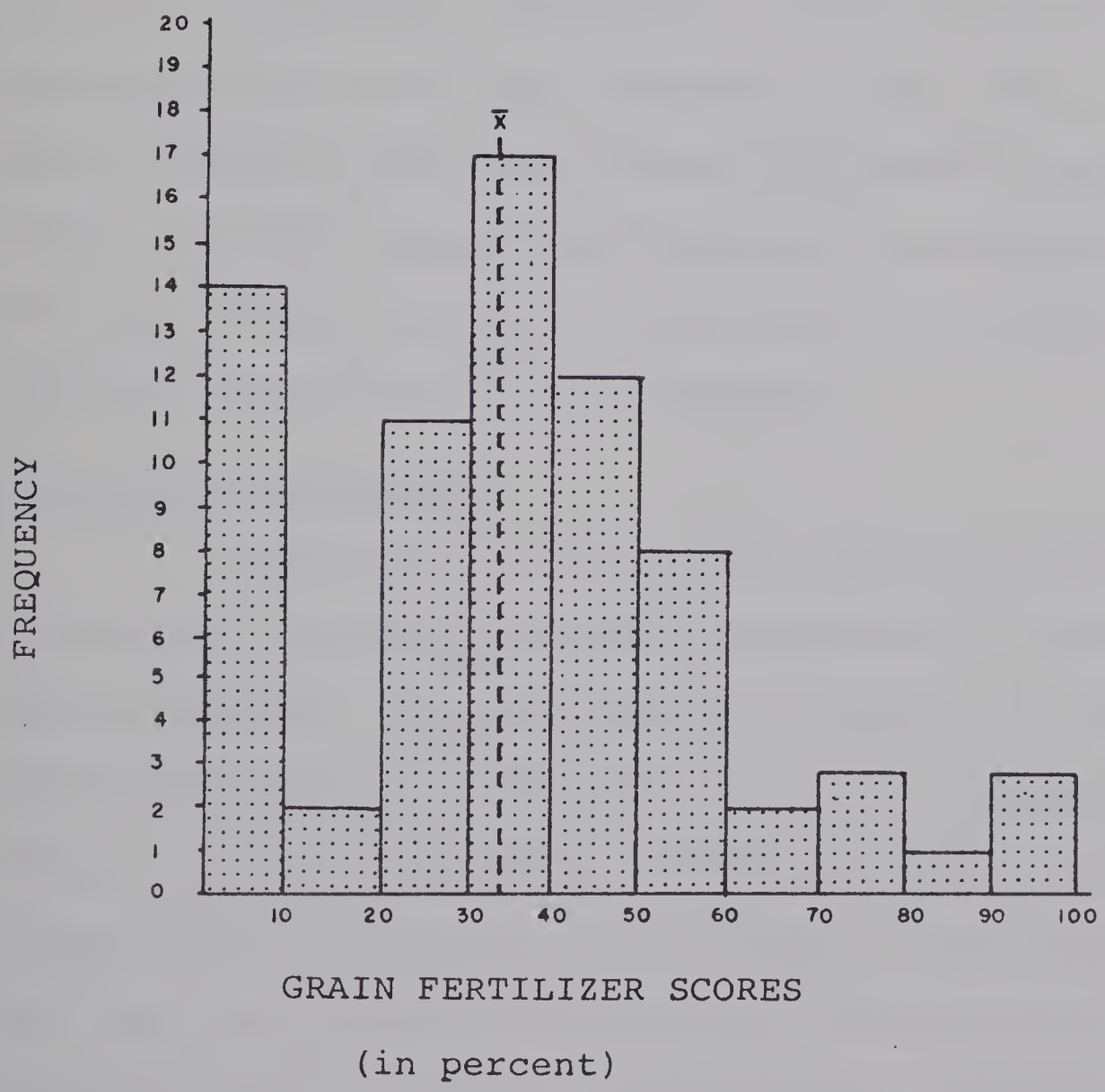
[1] Detailed recommendations and score calculation appear in Appendix I.

Figure 3

FREQUENCY DISTRIBUTION OF GRAIN FERTILIZER SCORES



(Figure 4) has two peaks because a large proportion of the respondents (27 percent) were assigned zero scores for fertilizer application on hay. The mean and standard deviation are 38.30 and 30.75 percent respectively. Those respondents fertilizing hay were using at least one-half the recommended application rate.

Rotation scores

The farmer's rotation plan was also scored on a scale of 0 to 100 percent where 100 percent represents following the recommendations for crop rotation. Over one-half of the farmers (56 percent) were following the extension recommendations for crop rotations in the area. It can be seen (Figure 5) that most farmers followed a rotation plan, with a sizeable proportion following the recommendations. The mean of the rotation scores was 72.35 percent with a standard deviation of 36.51 percent.

Livestock management

There were 11 farms (14.1 percent) which reported having no livestock, while the remaining 67 reported having some livestock. The distribution (Figure 6) of the livestock management scores on the scale of 0 to 100 percent ranged from a low of 0 to a maximum of 87.5 percent. When the 11 farms without livestock were included in the calculations, the mean and standard deviation of the scores were 41.92 percent and 27.74 percent respectively. Omitting the farms without livestock resulted in an increase in the mean to

Figure 4

FREQUENCY DISTRIBUTION OF HAY FERTILIZER SCORES

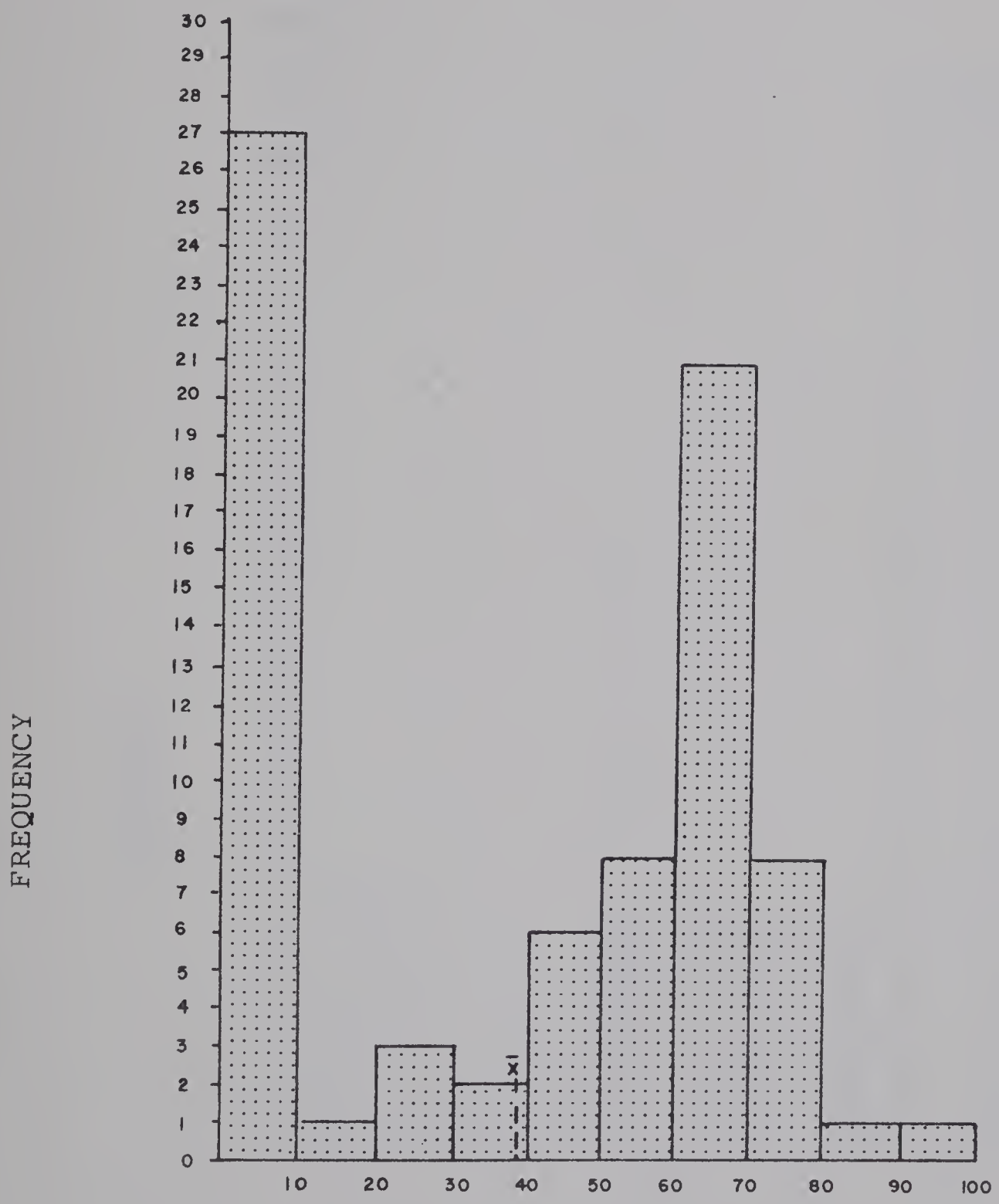


Figure 5

FREQUENCY DISTRIBUTION OF ROTATION SCORES

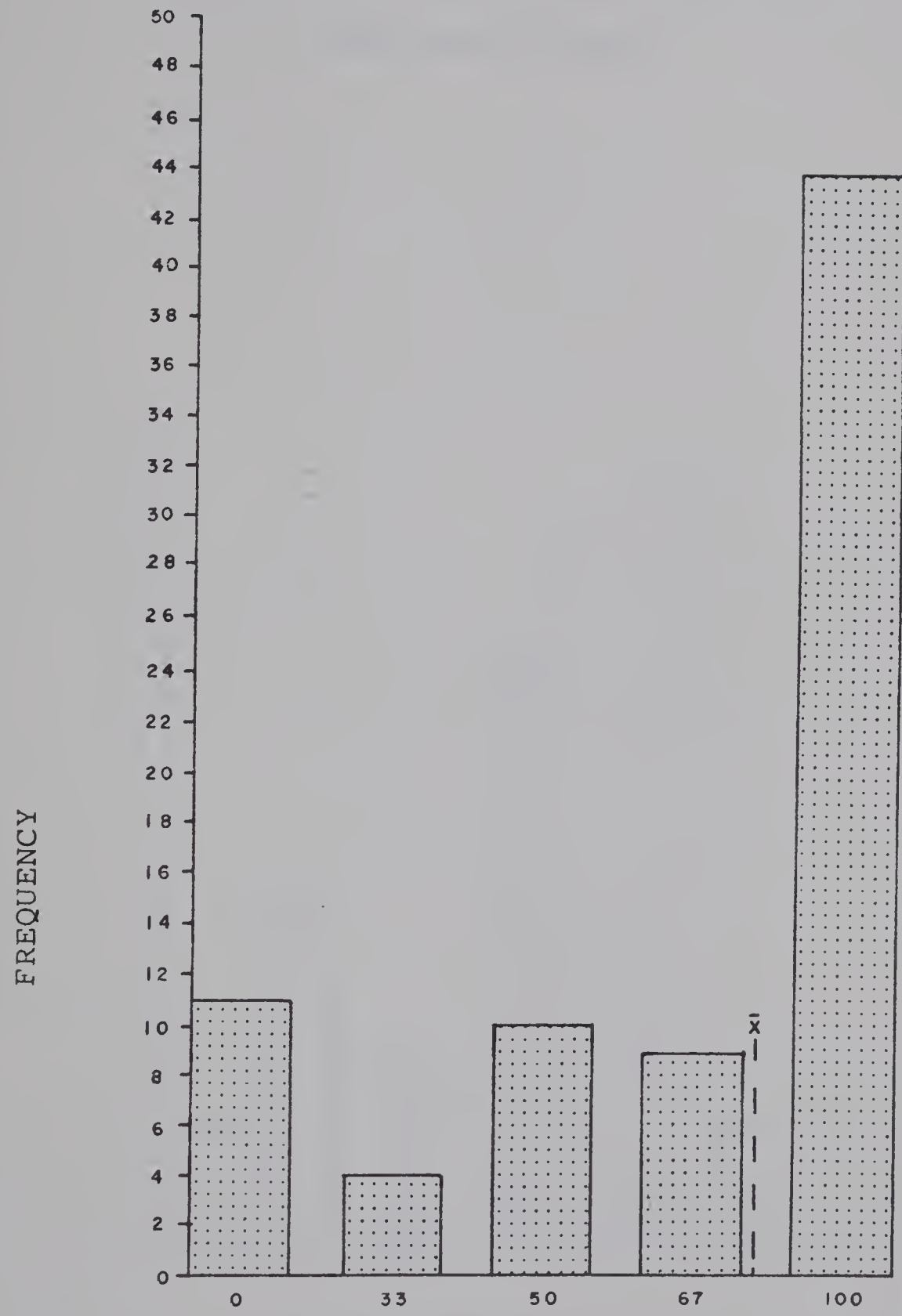
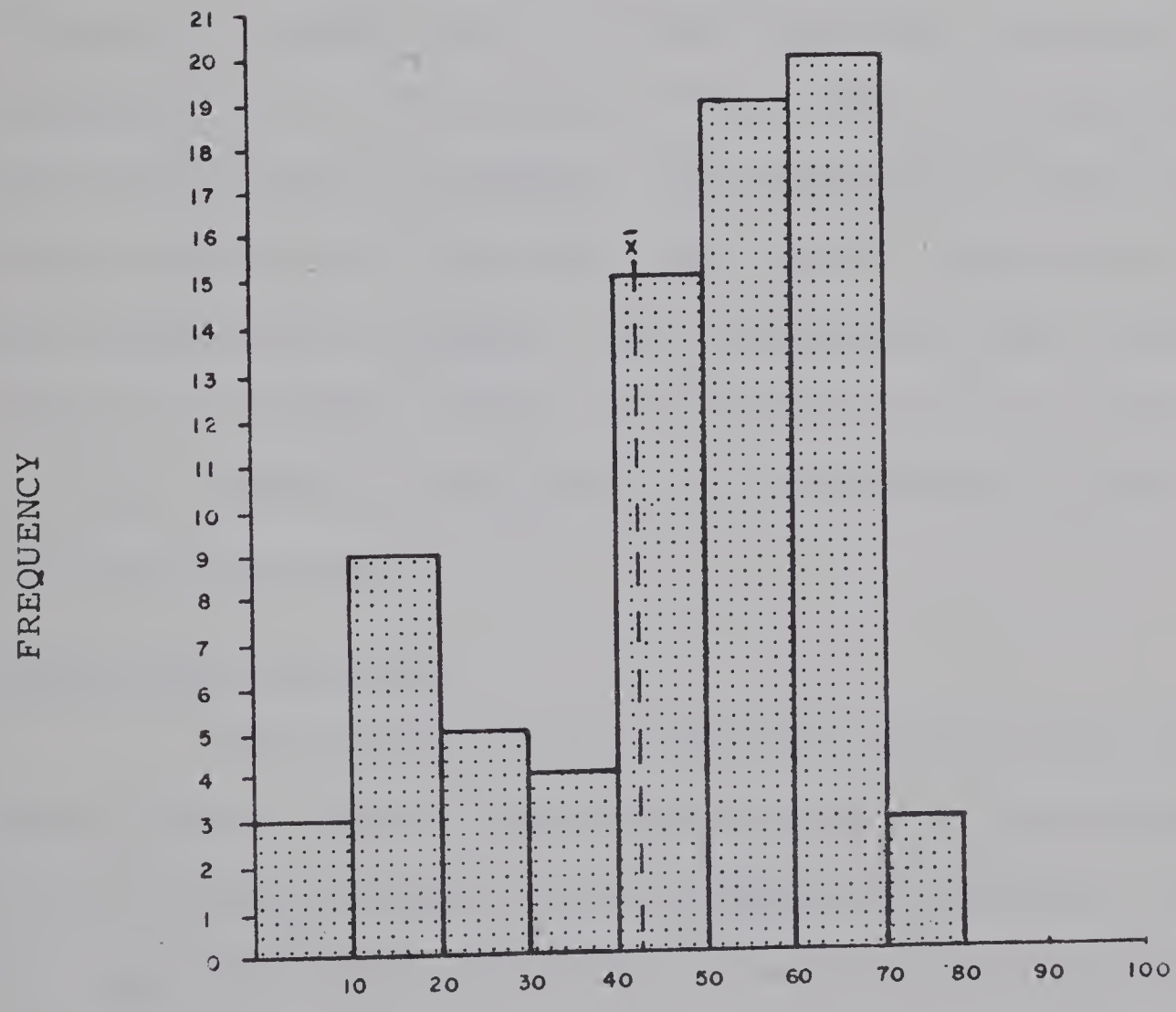


Figure 6

FREQUENCY DISTRIBUTION OF LIVESTOCK MANAGEMENT SCORES



48.81 percent and a reduction in the standard deviation to 23.66 percent. The average farmer with livestock used almost one-half the recommended livestock management practices included in the survey.

Composite score

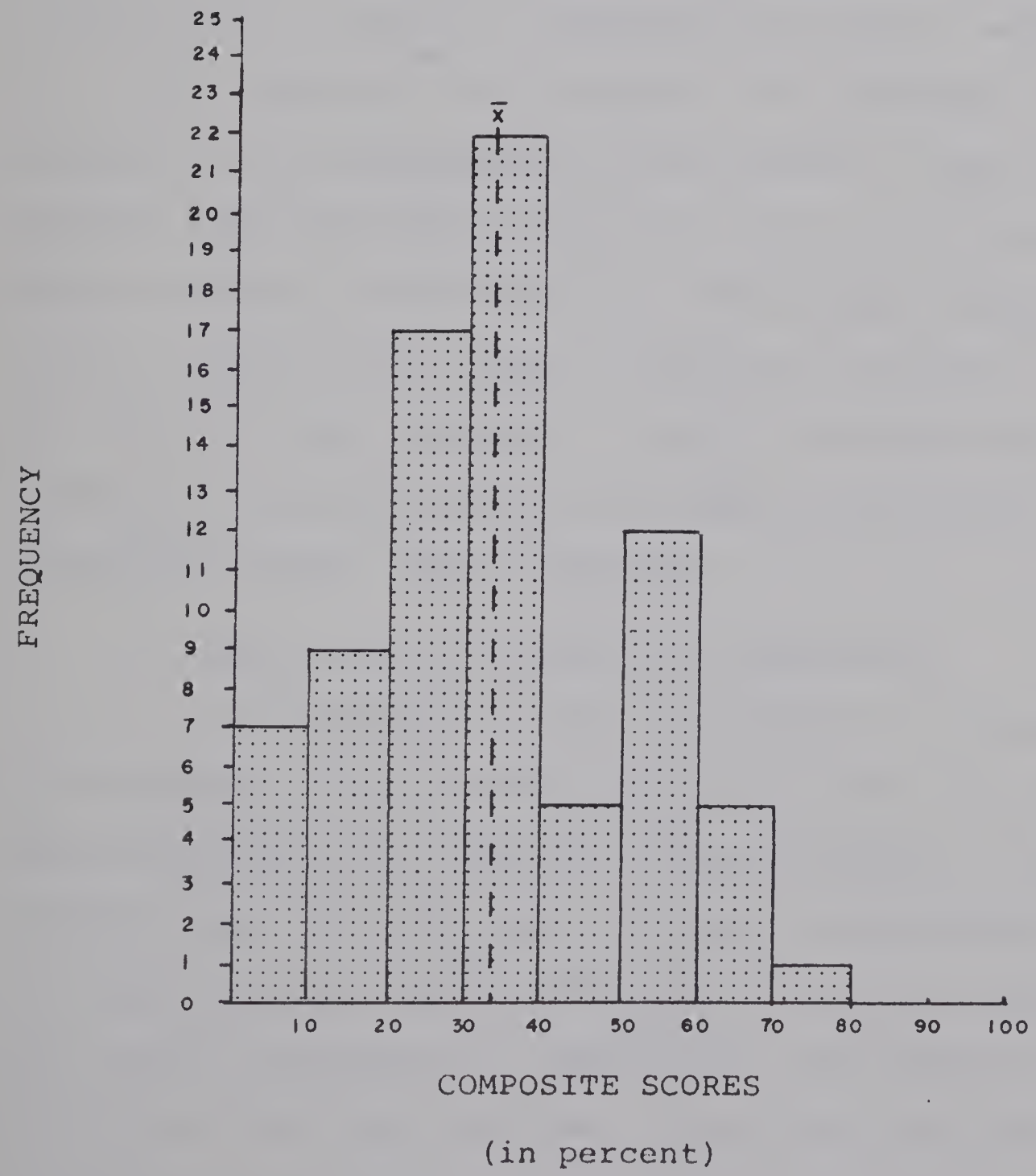
The composite score included soil testing, chemical control of weeds and wild oats, and level of completeness of record keeping on the farm. The composite records, soil test, and chemical control scores were distributed (Figure 7) around a mean of 33.17 percent, while the standard deviation was 17.38 percent. There were 48 respondents with scores below the mean. The remaining 30 were assigned scores above 33.17 percent. The lowest score was 0, the maximum 76.9 percent. The distribution was skewed towards the higher scores, indicating a lack of use of soil testing, chemical herbicides, and recommended record keeping practices.

Technology use score

The technology use score was calculated from the above items. It was designed to provide a representation of the farmer's use of the recommended management techniques and applicable farm practices. The score was based on a percentage scale with 0 representing no use of the specified technology and 100 percent representing exact compliance with the recommendations. The technology use scores ranged from 0 to 74.31 percent. The mean was 46.89 percent; the

Figure 7

FREQUENCY DISTRIBUTION OF COMPOSITE SCORES



standard deviation 18.48 percent. It can be seen (Figure 8) that the distribution was skewed toward the lower scores. The most frequent scores fell between 60 and 70 percent with 20 respondents (25.6 percent) utilizing approximately two-thirds of the recommended practices included in this project.

The technology use score was calculated as a measure of the level of use of technology on the farm. It did not include the time of adoption of the farm practices. However, it can be concluded that a farmer who achieves a high score in level of technology is also an earlier adopter in a time sequence.[1] For example, the individual who had adopted 12 to 15 practices can be assumed to have adopted earlier than the farmer employing only 4 to 6 practices. Rogers reports a correlation of +.90 between scales including time of adoption and number of practices adopted.[2] On the basis of this evidence, it can be concluded that the farmers who achieved relatively higher scores had a relatively higher rate of adoption.

Basic Characteristics of Respondents

A description of the respondents is presented under five headings: (1) personal characteristics, (2) educational characteristics, (3) economic characteristics, (4) information contacts, and (5) attitudes. Personal characteristics included are age, ethnic background , farming experience, and spouse's background. Educational achievements of both husband and wife are included. Farm size, net worth, and

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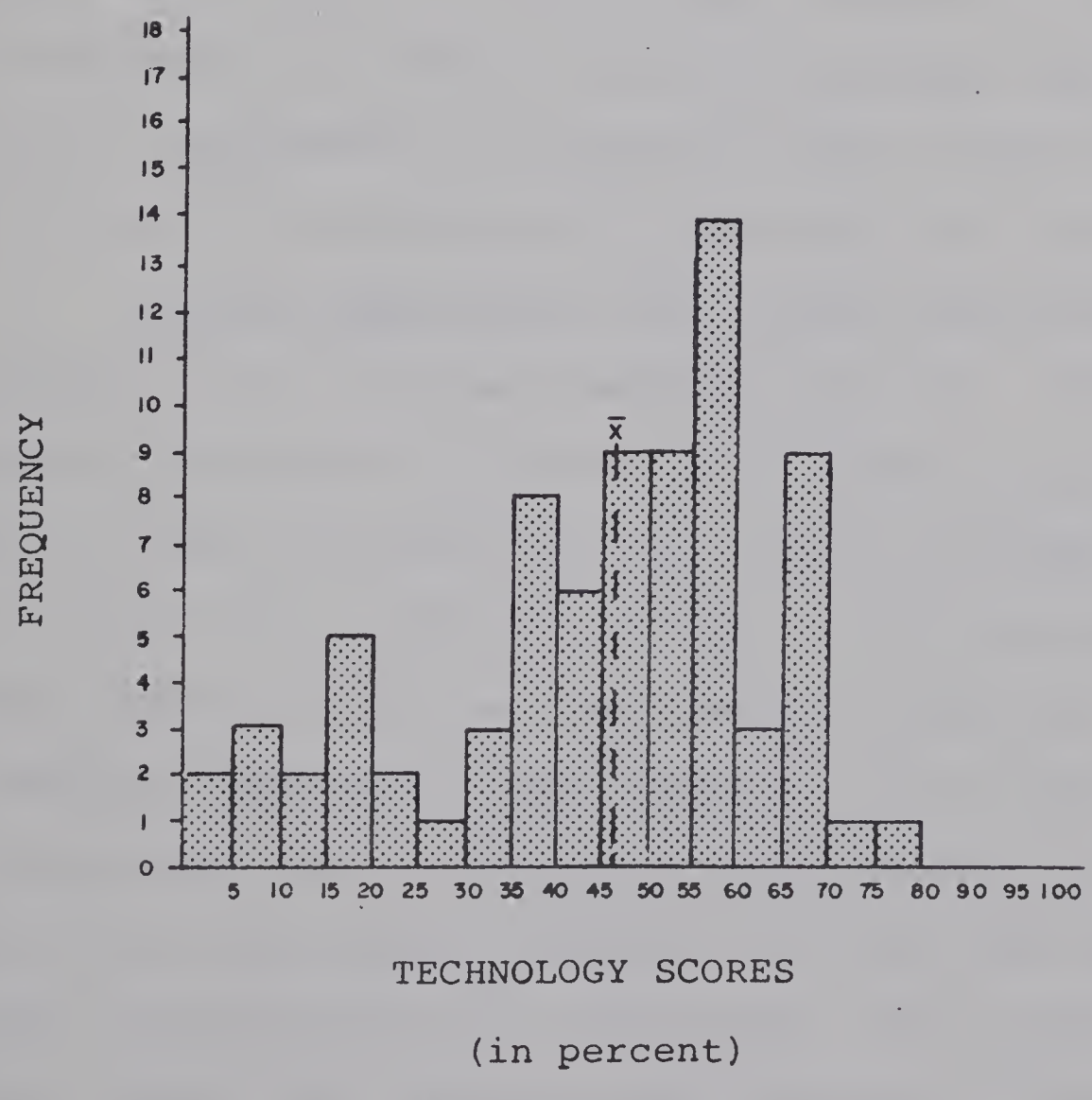
[1] Everett M. Rogers, "Categorizing the Adopters of Agricultural Practices," 352-353.

[2] Ibid., 353.

Figure 8

FREQUENCY DISTRIBUTION OF TECHNOLOGY SCORES



income are among the economic characteristics reported. The levels of contact with the mass media, district agriculturist, and other extension agencies are presented. Summaries of the respondent's attitudes toward change, credit, innovations, economic motivation, etc. are included in the attitude section.

Personal Characteristics

Age--The average age of the respondents was 46.86 years with standard deviation of 11.59. The youngest respondent was 24; the oldest was 69 years old. Thus, the range of ages was 45 years. It can be seen (Figure 9) that the age distribution is skewed towards the younger ages. There are only 9 respondents (12 percent) under 35 years of age, but there are 20 respondents (26 percent) over age 55.

Farming experience--Mean farming experience was 18.92 years with a standard deviation of 11.35. The farming experience distribution (Figure 10) is skewed to the greater number of years of experience even though the range was from 2 to 48 years, almost equivalent to the age range reported above. If the mean age and experience are compared, the average respondent started farming at 27.94 years of age. A comparison of the distributions indicates that several farmers must have entered farming at an older age than the average. An explanation for the average time of starting farming, around 1950, could be that there was a significant increase in homsteading associated with development of oil

Figure 9

FREQUENCY DISTRIBUTION OF AGE OF RESPONDENTS

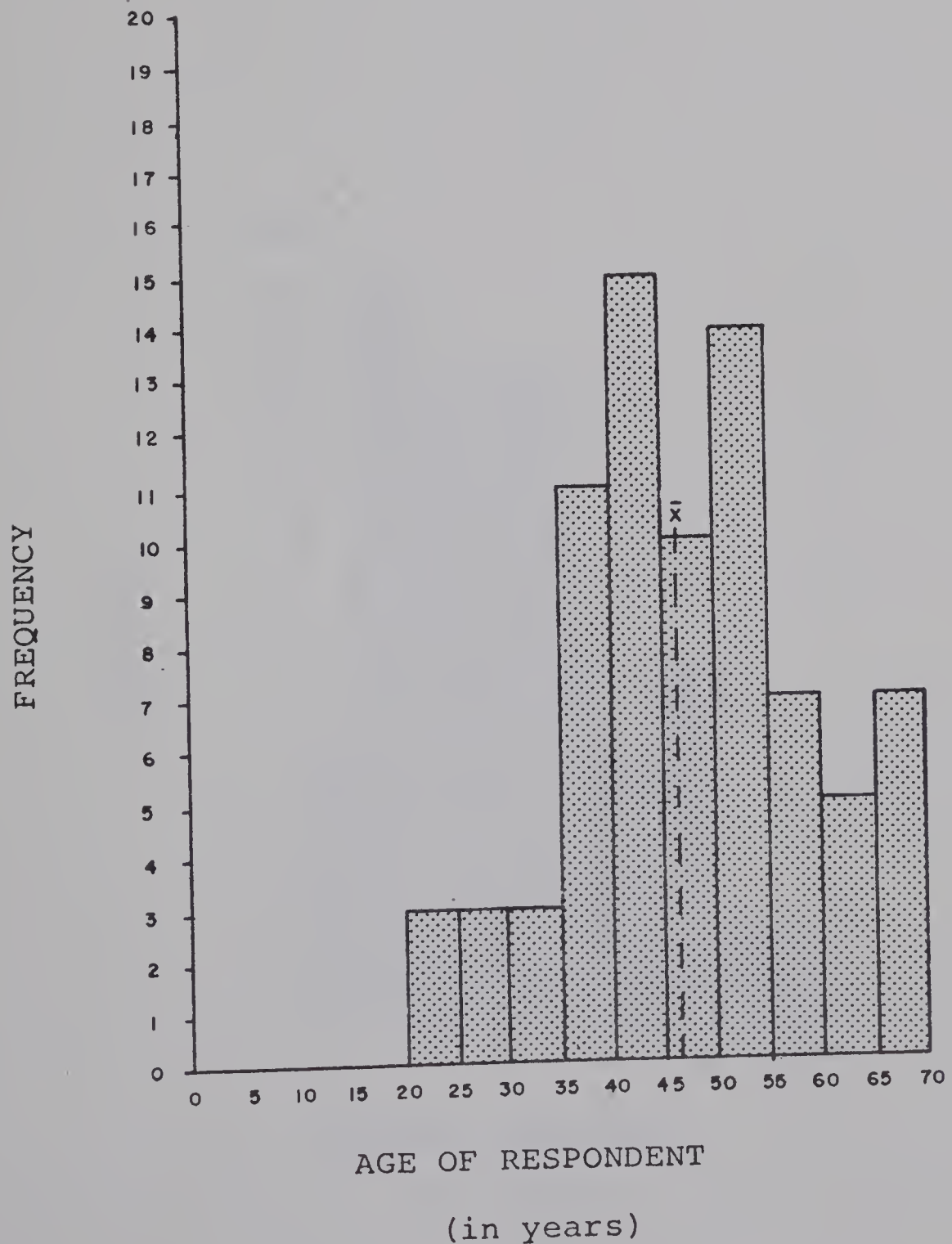
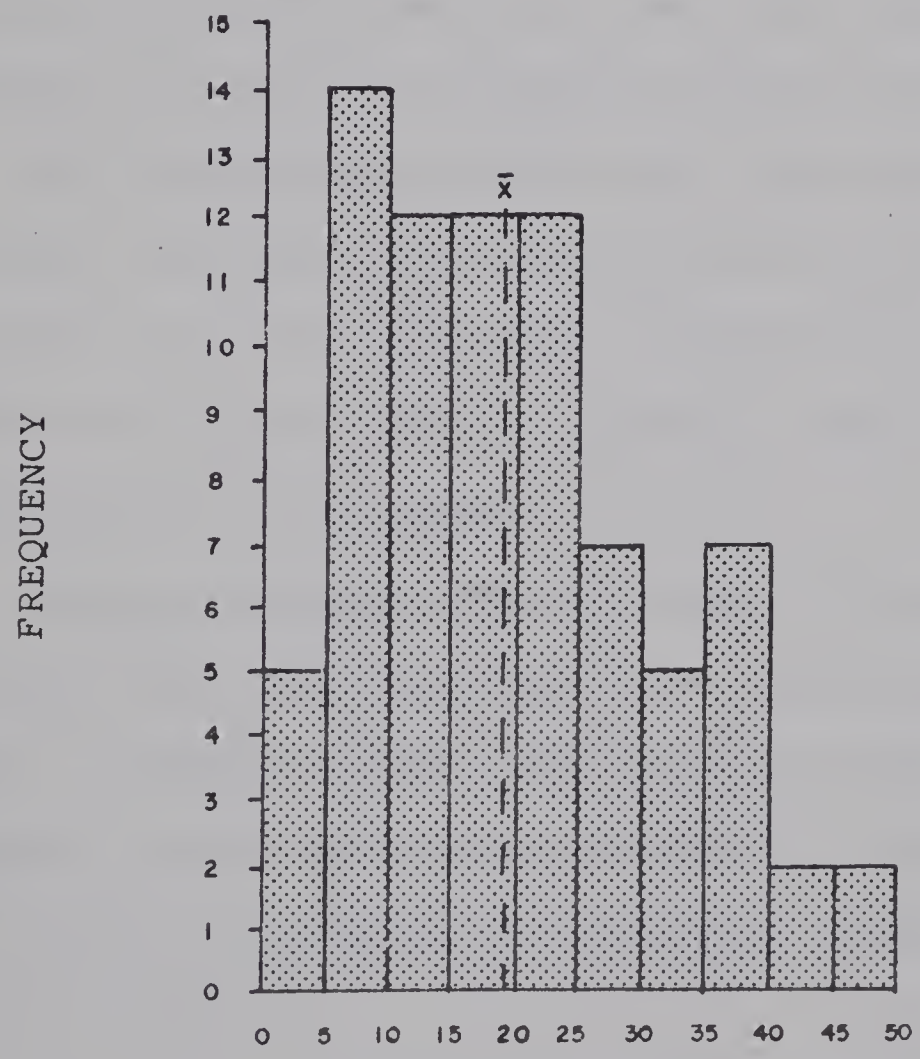


Figure 10

FREQUENCY DISTRIBUTION OF RESPONDENTS' FARMING EXPERIENCE



discovery and exploration in the area. A number of the respondents reported oil field work experience prior to entering farming.

Marital status--Most of the respondents were married. There were 8 single respondents, and 1 widow, the remainder of the sample (69) being married.

Ethnic backgrounds--The respondents' parents came from varied ethnic or cutlural backgrounds. East European ancestry was reported by 21 (27 percent), West European by 11 (14 percent), Scandinavian by 13 (17 percent), British Isles by 25 (32 percent), and the remaining 8 respondents (10 percent) reported North American ancestry.

The respondents' wives also came from various areas. East European ancestry was reported by 14 (20 percent), West European by 10 (15 percent), Scandinavian by 11 (16 percent), British Isles by 26 (38 percent), and North American by the remaining 8 (12 percent).

State of health--Most farmers (71 percent) did not consider their state of health to limit their farming activities. Sixteen farmers (20 percent) felt that their health limited activities somewhat. Health condition was felt to be a considerable limitation by the remaining 7 farmers (9 percent).

Father's occupation--Only 10 percent (8) of the respondents'fathers were not farmers; thus, a large majority of the respondents were raised on farms. The occupations were; 2 unskilled workers, 3 skilled workers, 1 professional, 2 other entrepreneurs, and 70 farmers.

Work experience--Most of the respondents held some other job before they started farming. Almost 72 percent (56) had other job experience. This implies that the remaining 28 percent (22) had acquired only farming experience. A large proportion of the work experience (84 percent, or 47 out of 56) of respondents who had held other jobs was in unskilled labor, either in the oil fields or in lumbering and brush clearing. Six respondents (11 percent) worked in semiskilled jobs, two in skilled positions, and one in a professional field (teaching).

Educational Achievement

Husband's education--A majority of the respondents (77 percent) had not completed more than 9 years of education (Figure 11). There were 24 (31 percent) who had attended school for 7 years or less, and another 23 (29 percent) had completed 10 or more years. The average number of years of education completed by the respondents was 8.19 with a standard deviation of 3.32. One reason for the concentration of educational level at 8 years may be the provincial legislation which requires school attendance up to age 15.[1] Most students reach 15 years of age during the eighth grade. The respondents who were unhappy in school probably left school after completing the eighth or ninth grades without going on to high school.

Wife's education--The respondents' wives' education levels tended to be higher, as is evidenced by the average

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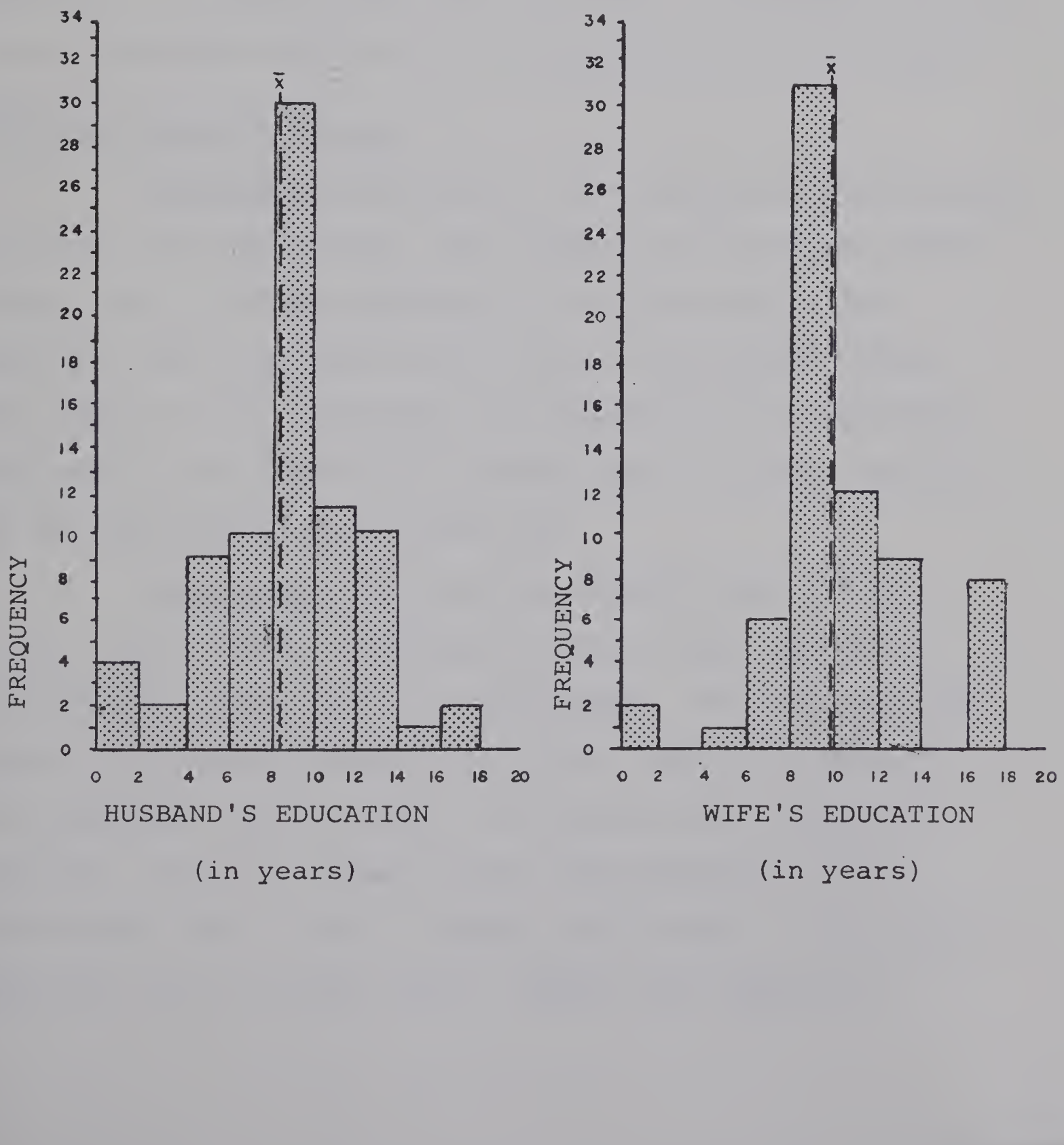
[1] Government of Alberta, An Act Respecting School Attendance, R.S.A., c. 55, s. 1, sec. 3, 1922.

Figure 11

FREQUENCY DISTRIBUTIONS OF EDUCATION LEVELS

FOR HUSBAND AND WIFE



of 9.78 years and standard deviaton of 3.32. The standard deviations of education levels for both husbands and wives were the same; the females, therefore, tended to complete more years of education. The difference between the education levels of husbands and wives appears (Figure 11) to result from the fact that fewer women than men (12 percent vs. 31 percent) finished less than 8 years of school. More women than men completed beyond 9 years (37 percent vs. 29 percent). It would appear that the male respondents married women with more education; i.e., up the educational ladder.

Economic Characteristics

Farm size--The size of farm operations varied widely among the respondents. The average farm size was 460.05 acres with a standard deviation of 267.48 acres. The smallest farm reported was 100 acres, the largest, 1360. The modal size of 320 acres was reported by 20 respondents, followed by 480 acres by 15 farmers and 13 farmers in each of the 160 and 640 acre categories.

Acres owned--The average farmer owned 362.87 acres. The standard deviation of acres owned was 231.70. Acres owned ranged from 0 to 1360 acres. The mode was 320 acres; 23 farmers reported this size. Next in frequency of occurrence was 160 acres; 20 farmers owned one-quarter section. Fourteen farmers owned three-quarter sections (480 acres) and 7 owned 1 section (640 acres). Two farmers operated only on rented land. Because the difference

between the mean acres owned (362 acres) and the mean farm size (460 acres) is approximately 100 acres, it can be concluded that the average farmer rents 100 acres.

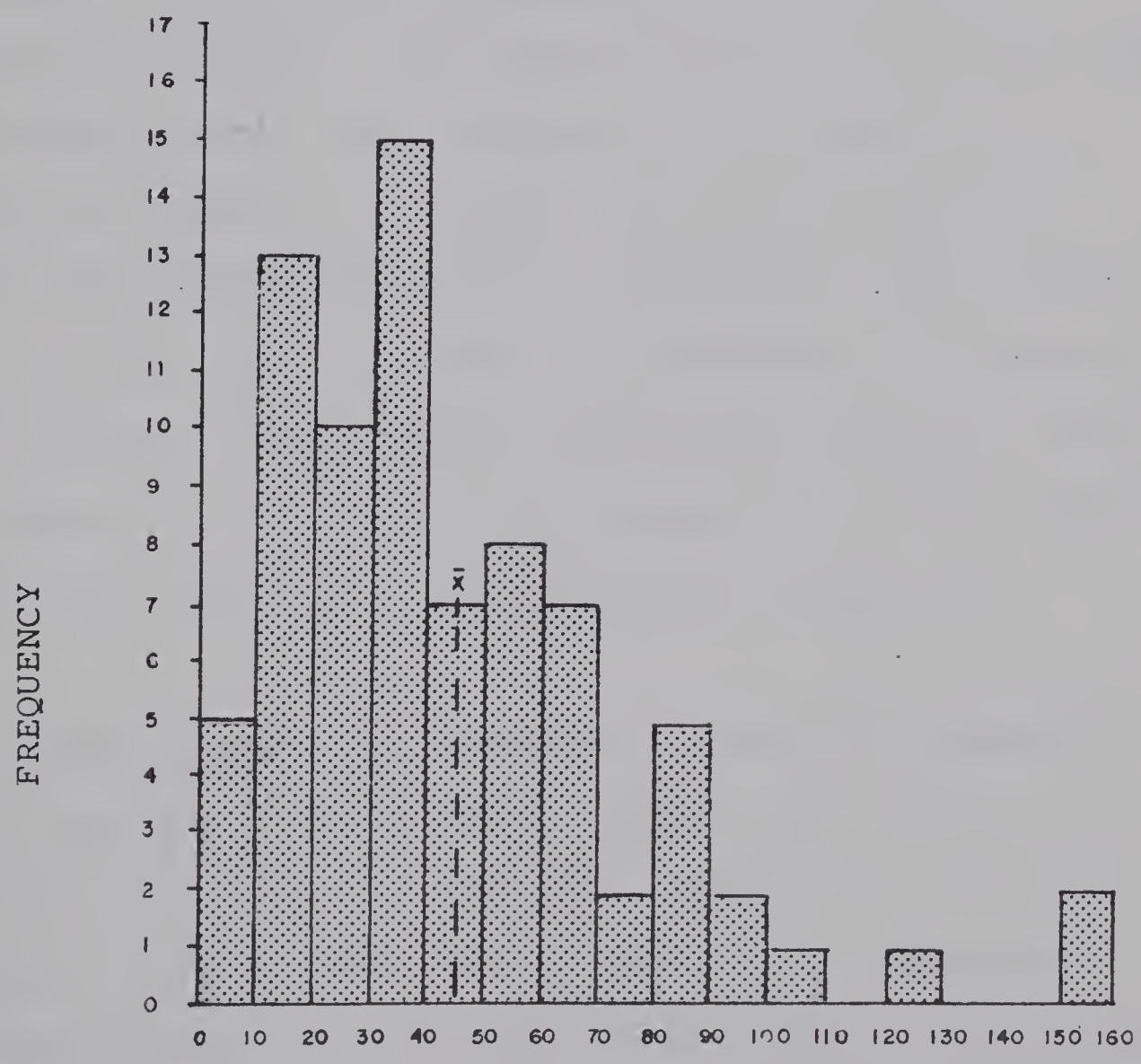
Total assets--The average farmer reported having $44,658 in total assets with a standard deviation of $31,381. Total asset values ranged from $3,000 to over $150,000, but were skewed to the higher values (Figure 12). The modal total asset value of between $30,000 and $40,000 was reported by 15 respondents (19 percent).

Indebtedness--The farmers reported a mean indebtedness of $5,082 with a large standard deviation of $7,364, which implies a wide debt range. There were 27 farmers without debt. Over one-half (54 percent) had farm liabilities of less than $2,600. Most farm liabilities involved long-term debt. The mean long-term debt was $3,572; intermediate-term debt averaged $803; short-term loans averaged $695; and other debt averaged almost $13 per farm. The long-term loans were for mortgage money to purchase and clear the land.

Debt-asset ratio--The ratio of debts to assets was calculated for each respondent. The 27 respondents (34.6 percent) with no debts had ratios of 0.0. There were 24 respondents (30.8 percent) with debt-asset ratios between 0 and 0.099. Ratios between 0.1 and 0.19 were calculated for 14 respondents (18.0 percent). Six respondents (7.7 percent) had debt-asset ratios greater than 0.2 and less than 0.3, while 3 respondents (3.8 percent) were between 0.3 and 0.39. Only 1 respondent was in the 0.4 to 0.49

Figure 12

FREQUENCY DISTRIBUTION OF TOTAL ASSETS



category. The remaining 3 respondents (3.8 percent) had debt-asset ratios greater than 0.5 but less than 0.6. Debt-asset ratios ranged from a low of 0 to a high of 0.598 with a mean of 0.101. Most respondents were not extensively utilizing credit in their farming enterprises. The average respondent was only employing credit at a level of 10 percent of his total assets.

Net worth--If the average respondent sold all his assets and paid off all his liabilities, he would have $39,576 left for himself. The standard deviation was $28,118. The distribution of net worth (Figure 13) is skewed to the higher net worth values. The modal size of net worth is between $10,000 and $20,000 with 15 respondents (19 percent) reporting in this class. Another 14 respondents (18 percent) reported net worth values between $20,000 and $30,000. Thus, the most common net worth value lay between $10,000 and $30,000, even though the mean net worth was somewhat higher at $39.576.

Gross income--In an attempt to minimize respondent irritation, operators were asked to report their gross farm income in the class where it belonged, rather than state the exact figure. All the respondents answered the question. Incomes under $3,000 per year were reported by 29 (37 percent) of the respondents. Another 16 (21 percent) declared gross incomes from $3,000 to $5,000, 13 (17 percent) from $5,000 to $8,000, and 12 from $8,000 to $12,000. Incomes between $12,000 and $20,000 were reported by 7 farmers (9 percent).

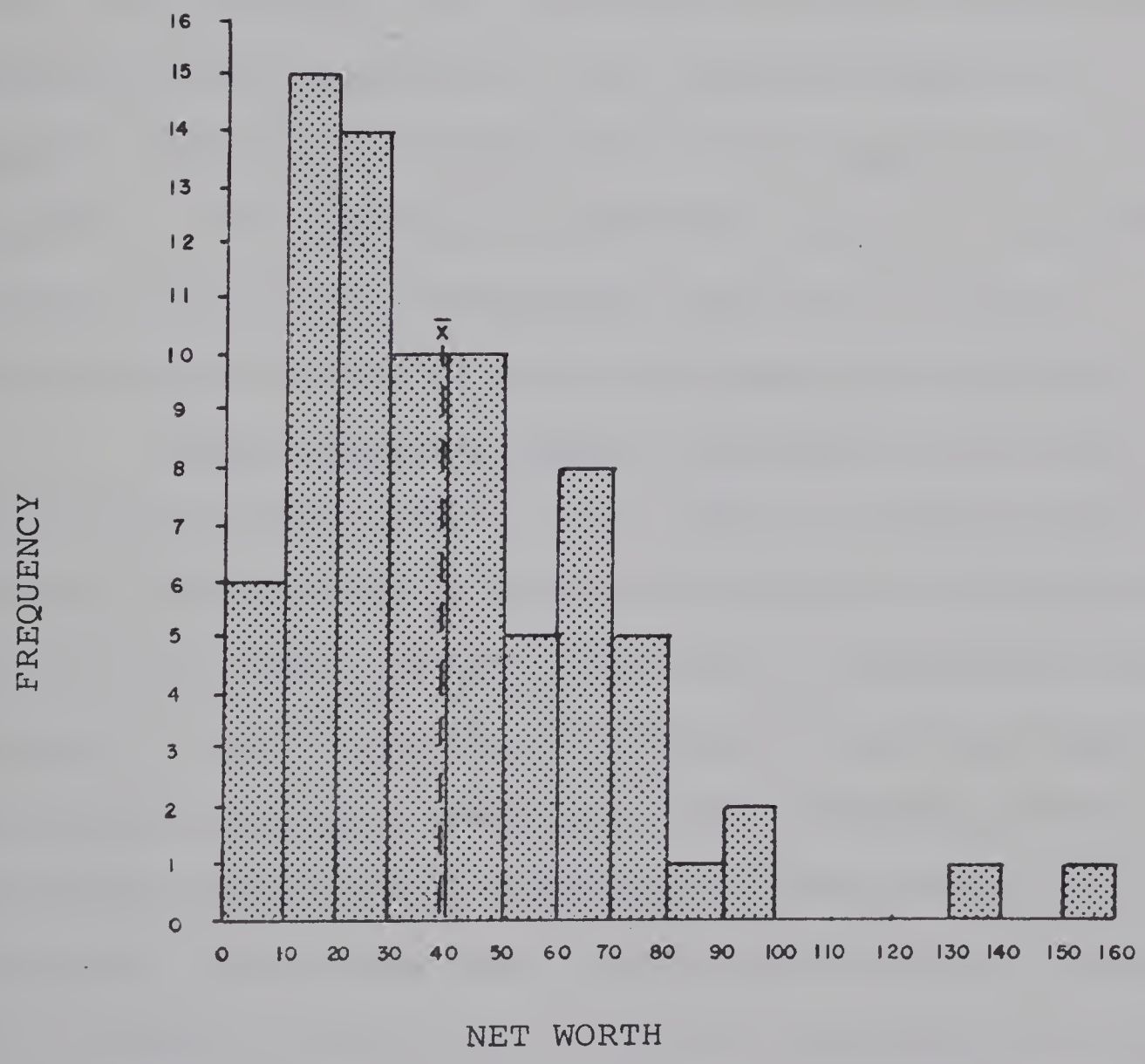
The remaining 1 respondent reported an annual income in excess of $20,000. Over one-half (58 percent) of the respondents indicated annual gross farm incomes of less than $5,000. The gross incomes reported were estimates by the farmers in response to a question asking the value of all farm products sold in one year. Even though the values given were estimations, the interviewers felt that the information was economically realistic for the farms concerned.

Annual reinvestment--The respondents were also asked, "How much money do you have available after all annual operational and living expenses are paid to invest in new ideas for the farm and make improvements in your operation?" Over one-half (62 percent) of the farmers reported that they had less than $2,000 left for depreciation and reinvestment in the farm. Another 28 (36 percent) reported they had between $2,000 and $5,000 to reinvest in the farm. One respondent declared $5,000 to $10,000, one other, over $10,000 for annual reinvestment. The replies reported are only rough estimations by the respondents in answering the question quoted above. In spite of the crudeness of their estimations, the replies appear to be economically reasonable. A net worth of almost $40,000 providing a gross income of up to $5,000 per year, of which under $2,000 is available for reinvestment in the farm operation seems feasible. A thumb rule for the relation of gross to net income is a 2: 1 ratio. A $5,000 gross income would provide $2,500 net income from which to pay living

Figure 13

FREQUENCY DISTRIBUTION OF NET WORTH

OF RESPONDENTS



expenses and supply improvements for the farm. It would appear that the majority of the farmers interviewed were eking out a bare survival on their farms and did not show significant annual growth in their net worth.

Information Contacts

Agricultural papers--Respondents were asked to list the agriculturally oriented newspapers or magazines they received. Only 5 (6.4 percent) respondents reported 1 or 2 papers. Nine reported 3 papers. There were 26 respondents (33.3 percent) who reported receiving 4 papers and magazines while another 24 (30.8 percent) reported 5 papers. There were 6 respondents (7.7. percent) who received 6 papers. The remaining 3 reported 7 papers. It appears that the majority of respondents received at least 4 agriculturally oriented papers or magazines regularly.

Best source of ideas--Respondents were asked to report where they turned to for ideas on running their farms. District agriculturists or other government officials were named as the best source of ideas by 15 respondents (19.2 percent). Five (6.4 percent) reported that they found government bulletins, pamphlets, the University farm, or government experimental stations the best sources of ideas. Newspapers, farm magazines, radio, and televsion were named by 9 farmers as their best sources of information. Only 2 respondents named commercial companies (e.g., banks, elevator companies, etc.) as the best information sources. Sixteen farmers claimed they found other good farmers

(including their fathers) as the best source of ideas. Six respondents reported their own ideas as the best source, and another 22 (28.2 percent) felt their own experience to be the best source of ideas for their farm. The remaining 3 said they used no sources of new ideas.

The largest group (28, or 35.9 percent) relied on themselves as the best source of ideas for farming. The second largest group (20, or 25.6 percent) felt their best source of ideas was government-sponsored sources, such as the district agriculturists and bulletins. Another large group (16, or 20.5 percent) named other farmers as their best source. Almost one-quarter of the farmers named government extension programs as their best source of ideas for farming.

The sources of information reported here are in contrast to the sources of information reported in a study completed in Saskatchewan. Lyster reported that "a majority of the farm population gets information from either the elevator agent or the pamphlets in his office".[1] Only 2 respondents (2.6 percent) in the Breton area stated they had found commercial companies (including elevator companies) to be the best source of ideas for their farm.

District agriculturist's name--Respondents were asked to state the name of the district agriculturist serving their area. There were 43 respondents (55.1 percent) who correctly stated his name. Another 5 named the county

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[1] Bryan Lyster, "Information and the Farmer in Southern Saskatchewan," Canadian Journal of Agricultural Economics, 18, No. 2, (1970), 25.

field supervisor instead of the district agriculturist. Over one-third of the respondents (29, or 37.2 percent) did not know the name of the district agriculturist. A partial explanation for the large number of respondents who did not know the district agriculturist could be the fact that 69 respondents (88.5 percent) lived between 30 and 60 miles from his office. The respondent probably would not make a special trip to consult with the district agriculturist.

District agriculturist contacts--Respondents were asked how many times their district agriculturist had visited their farm in the last year. They were also asked how many times they had visited his office and the number of field days or meetings they had attended where they made contact with him. Respondents were also asked if they read the district agriculturist's articles in the local paper. A score of three was assigned if they reported regularly reading his articles, two for sometimes, one for seldom, and zero if they reported never reading the articles. A district agriculturist contact score was calculated by summing the number of visits by the district agriculturist on the farm, the number of visits in his office, the number of meetings and field days attended, and the score for articles read in the paper.

The district agriculturist contact score ranged from 0 to 26, indicating a wide range in the degree of contact with the district agriculturists. There were 11 respondents

(14 percent) who reported no contact with the district agriculturist during the past year. Twenty-two respondents (28 percent) were assigned a score of 1 or 2; another 21 (27 percent) achieved a 3 or 4 on the scale. Scores of 5 or 6 were assigned to 8 respondents (10 percent), 7 or 8 to 5 (6.4 percent), and 9 or 10 to 4 (5.1 percent). Scores of 11 to 15 were reached by 5 respondents (6.4 percent); 2 respondents had scores higher than 15 on the district agriculturist contact scale. Over one-half of the respondents (69 percent) were assigned scores of less than 4, indicating a low level of contact between area farmers and local district agriculturists.

Other extension and information contacts--Respondents were asked what other government extension contacts they had made in the last year. They were assigned a score of four if they had visited the Breton soil science plots, three for a visit to the Lacombe experimental station, two for University of Alberta extension department contacts, and one for other government contacts. Respondents were asked to report the number of visits they had in the past year with commercial extension agents (eg., feed companies, fertilizer agronomists, etc.) to gain information or help with farming. The number of times they contacted other experts (including farmers) for advice or assistance with farming problems was also recorded.

The respondents' scores for other government extension contacts, commercial extension contacts, and

other experts were added together to yield a score for extension and information contacts with sources other than the district agriculturist. The scores ranged from 0 to 20, where 0 represents no contact and larger numbers represent increasing contacts. There were 50 respondents (64 percent) who reported no other extension contacts. A score between 1 and 5 was assigned to 22 respondents (28 percent); another 4 (5.1 percent) earned scores from 6 to 10. Only 2 respondents (2.6 percent) had scores greater than 10 on the other extension contact scale. The large number of respondents with low scores indicates that little extension work is being done by other departments of government or by commercial firms in the area.

Attitudes of Respondents

Progressiveness--The farmers were asked, "Do you seem to be one of the first around here to try new ways on the farm, or do you wait and see?" This question was designed to measure the operators' self appraisal of progressiveness. The replies were grouped into seven classes of progressiveness ranking from the most to the least progressive reply.

Four farmers said that they were among the first to try new ideas in the community. Three respondents indicated willingness "to try anything that comes along and sounds good." Depending on the availability of money, 12 said they tried many new ideas. Nine farmers reported

preferring to use their own ideas--"what works best for them." Eleven felt they were middle-of-the-roaders; "they sometimes tried new ideas." Sixteen farmers said they were not first to try new ideas, but tended to follow others. The largest group (23) preferred to "wait and see," or to use proven practices. Exactly one-half of the farmers said that they were among the followers, or those preferring to wait and see about new ideas. The respondents' evaluations of their own progressiveness placed them in a slow-moving group.

Credit--Attitude toward credit was also considered. Respondents were asked, "Credit stands in some people's way. How much credit do you think people should use?" Five respondents stated, "You should use all the credit you can get." A more cautious positon was taken by 18 respondents who felt that credit was "O.K." but "you shouldn't use more than you can afford" or than "you can pay back easily." "Credit is an advantage for the younger farmer, and you should use it to build yourself up," reflected the thinking of 13 respondents. Another 16 felt that it was "O.K." to use some credit; i.e., "what is necessary," but held the reservation that use of credit should not be abused. Ten replies indicated the respondents were of the opinion that some overextend credit. Five replies were grouped into a miscellaneous category including such statements as "one-third of yearly income," "credit only helps other people's pockets" (i.e not the borrower), or "don't know." Eleven respondents were sure of their convictions when they stated,"People

should not use any credit at all." In general, about two-thirds of the respondents indicated a favorable but conservative attitude toward the use of credit by farmers.

Expansion capital--The following question was asked: "Money available for expansion for your farm is: (a) too plentiful_____,(b) about right_____, or (c) too little _____?" Expansion capital was too scarce for 30 farmers, while over one-half (42) indicated that money availability was "about right" for them. The remaining five respondents felt that expansion money was too plentiful. These individuals may have also been in the group that felt people should not use any credit.

Best farmers--The respondents were asked their opinion as to who were the best farmers in the area. Only 12 respondents reported that they felt the best farmers were always trying new ideas. Exactly one-half (39) felt the best farmers were sometimes trying new ideas. The remaining 27 (34.6 percent) were more conservative; they reported that the best farmers were using only proven, accepted practices.

Rate of Change--Replies to the question, "About how often have you made changes since you've been farming?", ranged from never to all the time. Because the word "changes" was not specifically defined, its interpretation was left up to the farmer. It became apparent to the interviewers that some respondents considered only changes in major practices, while others thought of small changes.

The answers are therefore, somewhat nebulous. The frequency of change as reported in the replies provides an indication of the operator's receptivity to change. If he were changing all the time, his attitude toward a change in technology would theoretically be favorable.

Twenty-one (27 percent) operators said they had made no changes since they started farming. Ten reported changing every 1 or 2 years. Changes every 3, 4, 5 or 10 years were reported by 5 operators. Seven reported "seldom changing," 10, "not many" or "not very often." Another 11 respondents reported several changes; i.e., 3, 4 or 5. Four operators reported quite a few changes; 7 reported at least 1 change every year. Only 3 farmers reported making changes all the time. The respondents replies indicate that they do not feel they are changing their farm operations regularly.

Risk and uncertainty--The respondents' attitudes toward risk and uncertainty were investigated with the question, "When expanding farm size, yield uncertainty is: (a) the biggest problem_____, (b) one of the biggest_____, (c) an important problem_____, or (d) easy to cope with_____." It was theorized that the respondent who was concerned with risk would feel that yield uncertainty was a greater problem than the farmer who either was not worried about risk or felt he could minimize its effects.

Yield uncertainty when expanding farm size was the "biggest" problem to only 9 respondents. It was "one of the

biggest" problems to 29 respondents, and an "important problem" to 18 farmers. Twenty-two felt it was "easy to cope with." The replies to this question indicate that the farmers interviewed were not overly concerned with the risk of crop losses if they were expanding their farm size.

Religious denomination--Respondents were asked to state their religious denomination in an attempt to determine the relationship between denomination and technology level. Five respondents gave no reply; 3 stated they had no religious denomination. Another 5 respondents simply said they were Protestants. Nine respondents reported Pentecostal or Baptist affiliations. There were 15 Roman and Greek Catholics and 17 Lutherans. The most popular denominations were Anglican or United Church with 24 respondents stating one of these as their preference.

Innovation proneness--An innovation proneness rating for the respondents was compiled using the Straus Rural Attitudes Profile.[1] The scores on this scale can range from a minimum of -12 to a maximum of +12. High scores on the innovation proneness scale indicate individuals who have an interest in and a desire to seek changes in farming techniques and to introduce such changes in their own operation when practical. These persons tend to select phrases like "Has tried out several new farm practices in the last few years" as being most like themselves. They

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[1] Murray A. Straus, op. cit., pp. 28-29.

might mark as least like themselves phrases like "Believes that the traditional ways are the best ways of doing things." For high scoring individuals, keeping up with the latest technological development has an intrinsic positive value. In contrast, low scoring individuals either negatively value or are neutral toward changes in farming methods.

Respondent scores on the innovation proneness scale ranged from -8 to +11. The mean and standard deviations were 2.50 and 4.02 respectively. The distribution (Figure 14) was somewhat skewed to the lower scores. The most frequent scores were +2 and +3 with 9 operators scoring at each of these levels.

Primary group preference--Individuals who find their associational needs best met by primary type contacts with family and neighbours are expected to earn high ratings on the primary group preference scale. This contrasts with those who seek the greater freedom and diversity of urban association patterns and, therefore, achieve lower scores on the scale. A high scoring individual might select as least like himself statements like "Gets little pleasure out of visiting neighbours" and as most like himself "Feels a family ought to do things together."

As in the innovation proneness scale, the primary group preference scores could range from -12 to +12. A score varied directly with preference for primary group contact. Primary group preference scores (Figure 15) ranged from -4 to +7. The distribution was somewhat skewed

Figure 14

FREQUENCY DISTRIBUTION OF INNOVATION PRONENESS SCORES

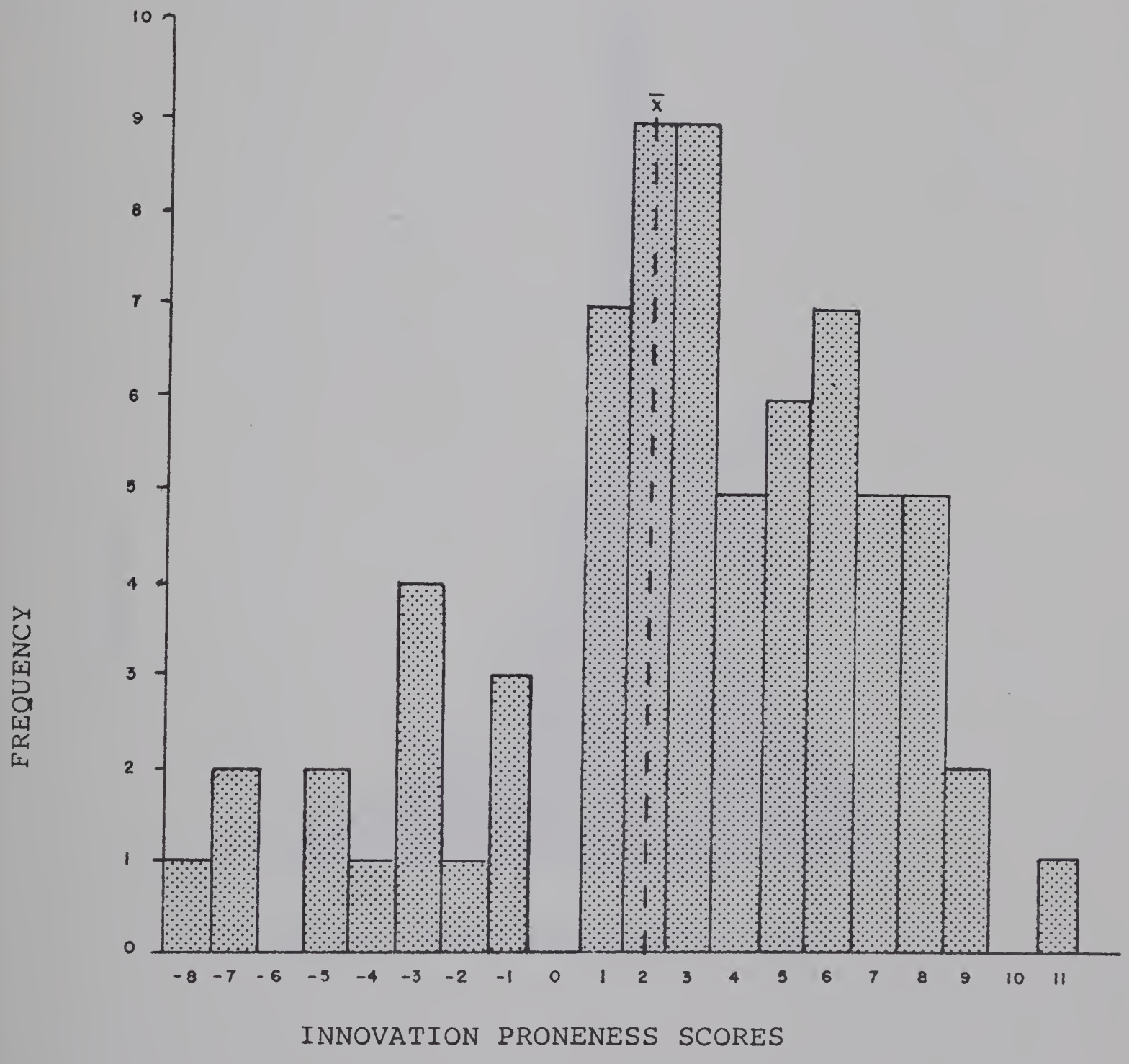
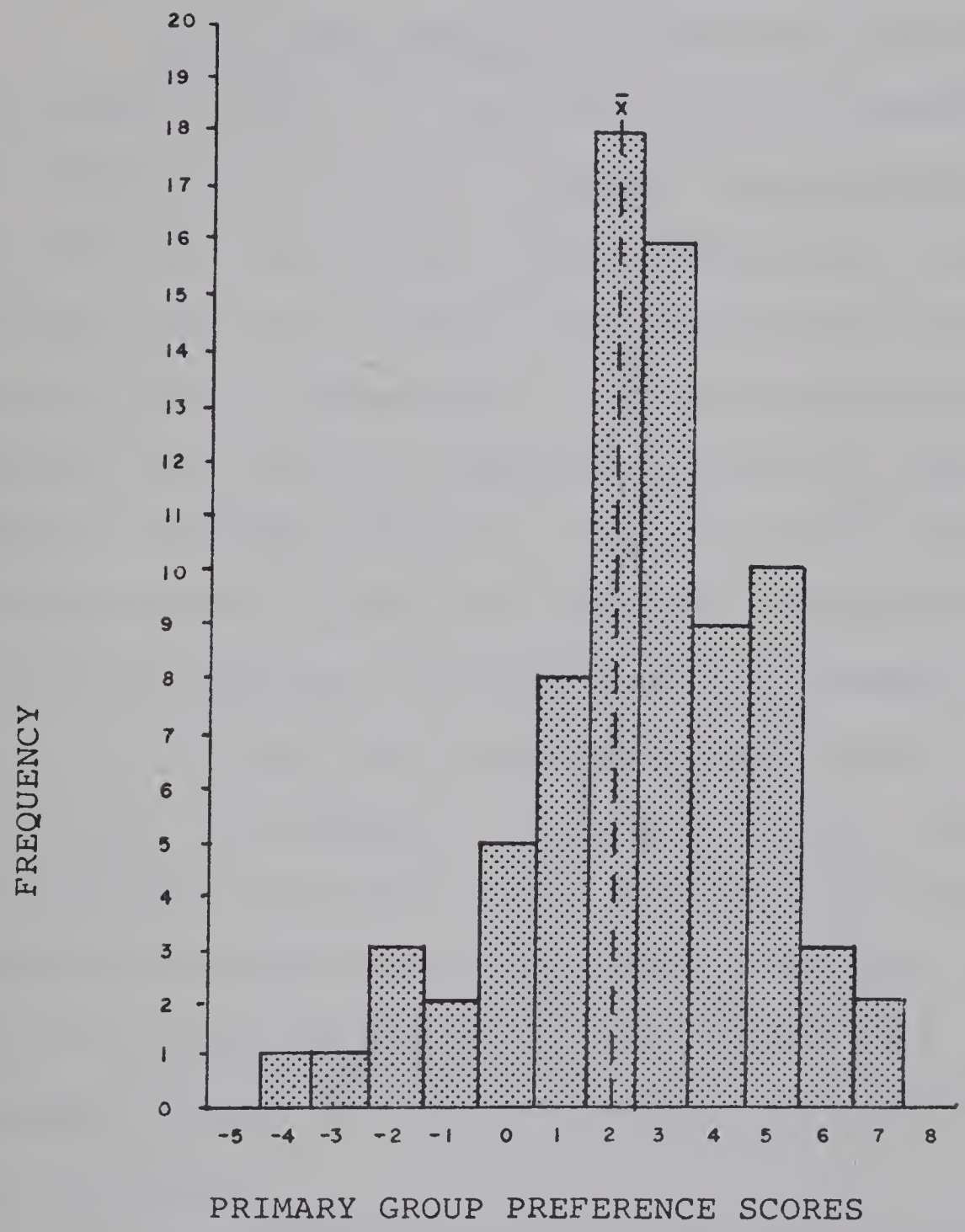


Figure 15

FREQUENCY DISTRIBUTION OF PRIMARY GROUP PREFERENCE SCORES



to the lower scores of the range, resulting in a mean score of 2.5 and standard deviation of 2.208. The mode was at a score of +2 with 18 respondents falling in this category. The normal respondent tended to prefer primary to secondary group relationships.

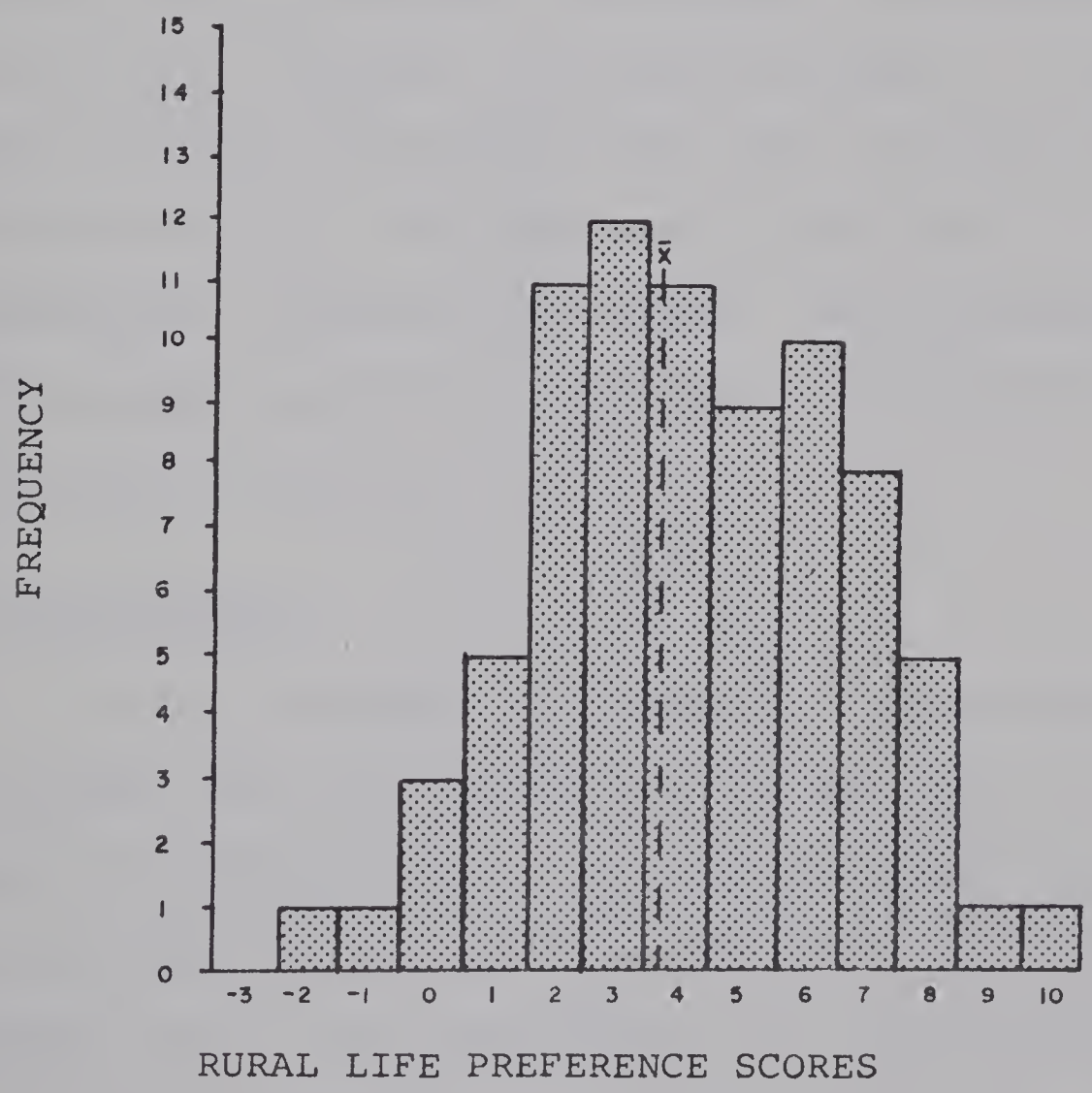
Rural life preference--Individuals who view farming objectively as one of a number of possible occupations are expected to score low on the rural life preference scale. Those to whom farming and rural residence are the most desirable aspects of working and living can be expected to score high on this scale. A high scoring individual (prefers rural life) is expected to select as most like himself a statement such as "Likes to watch things grow." He would chose a phrase like "Dislikes being tied down to chores or irrigating" as being least like himself.

The rural life preference scores could range from -12 to +12. The higher a respondent's score, the higher is his preference for rural life. The rural life preference distribution (Figure 16) ranged from -2 to +10. The mean score was 4.15; the standard deviation was 2.47. The normal respondent tended to place a reasonably high value on rural life conditions.

Economic motivation--An individual who scores high on the economic motivation scale is one who feels monetary gain is more important than such traditional rural values as self-sufficiency and freedom from debt. A highly economically motivated individual would probably select as

Figure 16

FREQUENCY DISTRIBUTION OF RURAL LIFE PREFERENCE SCORES



most like himself a statement such as "Believes that the old idea that anyone who is ambitious and works hard can get ahead is no longer true." He would be likely to select as least like himself such phrases as "Would rather make $3000 a year and be free of debt than make $5000 per year and be in debt" or "Believes that the ideal farm is one in which all the work can be done by the farmer and his family."

In the distribution of economic motivation scores (Figure 17), the higher the score, the greater is the level of economic motivation; conversely, the lower score values indicate a lack of economic motivation, The range of scores was from -8 to +6 within the possible range of -12 to +12. The mean economic motivation score was -1.24 and the standard deviation was 3.10. The mode was at the score of -3 with 14 respondents achieving this score. Most repondents lacked economic motivation, however; a few individuals showed some motivation.

Inter-correlations

A more accurate understanding of the respondents can be gained from the correlations between some of the characteristics studied (Table 1). Correlation coefficients between credit attitude and the variables of farm size, gross income, debt-asset ratio, and indebtedness were significantly different from 0 at the 5 percent level. It can be seen that the larger farmers were the ones with more total assets, higher gross incomes, more farm debts and who considered themselves

Figure 17

FREQUENCY DISTRIBUTION OF

ECONOMIC MOTIVATION SCORES

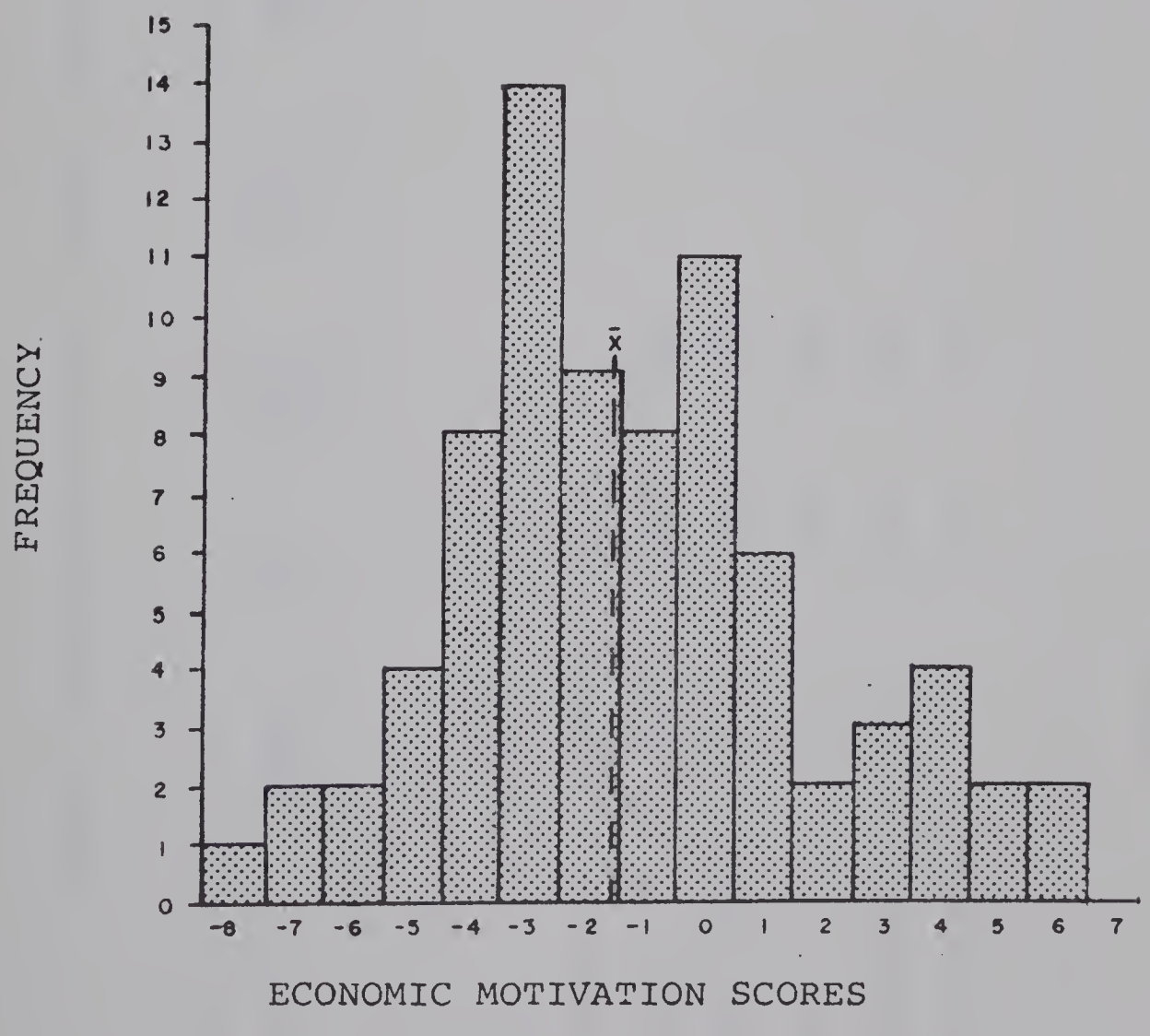


Table 1

SIMPLE CORRELATION MATRIX BETWEEN SELECTED VARIABLES

Characteristic	Credit Attitude	Farm Size	Total Assets	Gross Income	Debt Assets	Farm Debt	Progres-siveness	Expansion Capital
Credit Attitude	1	-	-	-	-	-	-	-
Farm Size	.263	1	-	-	-	-	-	-
Total Assets	.181[a]	.537	1	-	-	-	-	-
Gross Income	.191	.528	.655	1	-	-	-	-
Debt-Asset Ratio	.195	.130[a]	.137[a]	.232	1	-	-	-
Farm Debt	.255	.316	.537	.516	.789	1	-	-
Progressiveness	.100[a]	.259	.384	.250	.075[a]	.179[a]	1	-
Expansion Capital	.013[a]	.223	.163[a]	.345	-.051[a]	.099[a]	-.131[a]	1

Note: Coefficients with a superscript were not significantly different from 0 at the 5 percent level of significance.

to be more progressive. As could be expected, there was a significant relationship between gross income and total assets. The wealthier farmers also tended to have a higher debt load and considered themselves to be more progressive in accepting changes. The relationship between the debt-asset ratio and the size variables (size in acres and total assets) was not significant, implying that the larger farmers were not employing a higher proportion of credit in their farming operations than the smaller farmers. In other words, the amount of debt as a proportion of total assets did not vary with size of farm or the value of total assets. Gross income was the only characteristic among the eight listed which was significantly correlated with all the others.

The expansion capital score was derived from a question asking the farmer how much expansion capital was available for his operation. A score of 3 was assigned for a reply of "too much", 2 for "about right", and 1 for "too little," Thus the respondent who felt too much credit was available would have a higher score than the progressive respondent who reported that too little expansion capital was available. One would therefore expect the correlation coefficients between expansion capital and the other variables to be negative. However, the correlation coefficients between expansion capital and 2 measures of farm size (total acres and gross income) were positive and significantly different from 0 at the 5 percent level. The relationship to credit attitude, total assets, and farm debt was positive but not significant. The correlation with debt-asset ratio and progressiveness

was negative but also not significant. Apparently, respondents with higher incomes and larger farms were satisfied with the amount of expansion capital available to them.

Results of the Analysis

The general hypothesis in this study was that variation in certain social and economic characteristics of farmers in Alberta is related to variation in the levels of technology utilized by these farmers. Estimation of the relative importance of these characteristics in predicting the technology score was a specific objective.

Simple Correlation Coefficients

Simple correlation coefficients were calculated between selected characteristics and the technology score. Student's t-values for the correlation coefficients were also calculated.[1] Correlation coefficients and the corresponding t-values were calculated for characteristics in each of the five classes under consideration: (1) personal characteristics, (2) educational characteristics, (3) economic characteristics, (4) information contact, and (5) respondent attitudes.

Personal Characteristics--It can be seen (Table 2) that the correlations between personal characteristics and technology use were close to zero and thus significant only at very low levels.

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[1] Michael J. Brennan, Preface to Econometrics, (Cincinatti, Ohio: South-Western Publishing Company, 1965), p. 322. Formula for calculation: $t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$

Table 2

SIMPLE CORRELATION COEFFICIENTS BETWEEN TECHNOLOGY SCORE AND PERSONAL CHARACTERISTICS OF RESPONDENTS

Characteristic	r-value	t-value	level of significance
Age of respondent (yrs.)	-0.127	-1.13	50%
Farming experience (yrs.)	0.0036	0.032	-
Marital status	0.163	1.47	25%
Parent's background	0.200	1.83	10%
Number of children	0.092	0.814	50%

Only marital status and parental background appear to have any effect on a respondent's use of recommended farm technology. An unmarried respondent was likely to have a higher technology score than his married counterpart. Respondents whose parents were from North America were also more likely to be utilizing more of the technology than those from western or eastern Europe.

Educational characteristics--Educational characteristics of respondents appear to have a greater effect on their technology scores than personal characteristics. This is borne out by the higher student t values and consequently higher levels of significance (Table 3).

Education level of the wife appeared to be more important than that of her husband. In other words, variation in the wife's education was more closely related to

Table 3

SIMPLE CORRELATION COEFFICIENTS BETWEEN TECHNOLOGY SCORE AND EDUCATIONAL CHARACTERISTICS OF RESPONDENTS

Characteristic	r-value	t-value	level of significance
Husband's education	0.169	1.53	25%
Wife's education	0.310	3.01	0.5%
Education desired for children	0.162	1.46	25%
Community participation	0.184	1.67	10%

the use of recommended practices than was the husband's education. Respondents whose wives had more years of education were utilizing a higher level of technology than were those who married women with less education.

Those respondents who desired higher levels of education for their children had somewhat higher technology scores. Similarly, higher technology scores were achieved by those respondents who were more active in community activities than by non-participants. The more active respondents may have had a greater opportunity to become aware of new ideas through their organizational participation than their less community minded counterparts.

Economic characteristics--The respondent's economic characteristics (Table 4) were,as a group, more closely related to his technology score than any of the other

Table 4

SIMPLE CORRELATION COEFFICIENTS BETWEEN TECHNOLOGY SCORE AND ECONOMIC CHARACTERISTICS OF RESPONDENTS

Characteristics	r-value	t-value	level of significance
Size of farm (acres)	0.372	3.79	0.5%
Acres owned in farm	0.419	4.46	0.5%
Total assets ($00.)	0.482	5.51	0.5%
Total debt ($00.)	0.299	2.88	1.0%
Debt-asset ratio	0.136	1.22	25%
Net worth	0.433	4.68	0.5%
Gross income scale	0.404	4.24	0.5%
Re-investment income scale	0.304	2.94	0.5%

four types of variables.

Correlation between the technology score and total assets was the highest of all the economic characteristics. All of the variables were significant at the 1 percent level of significance except the debt-asset ratio which was significant only at the 25 percent level. It can be concluded that the larger farmers (in size and assets) and also those with higher incomes were utilizing a greater proportion of the recommended practices than were the smaller farmers with less income.

Information contact--Correlation of the information contact items to the technology score was positive and significant at the 10 percent level or higher (Table 5).

Table 5

SIMPLE CORRELATION COEFFICIENTS BETWEEN TECHNOLOGY SCORE AND INFORMATION CONTACT SCORES

Characteristic	r-value	t-value	level of significance
District agriculturist contact score	0.348	3.47	0.5%
Other extension contact score	0.273	2.59	2.5%
No. of agricultural papers in home	0.205	2.59	10%
Best source of ideas score	0.474	5.36	0.5%

A respondent's technology score varied directly with his level of contact with the district agriculturist, and other extension agencies (government-sponsored and commercial). A lower level of relationship was evident for the number of agricultural papers received in the home. Those respondents who named more expert sources of ideas for farming information (i.e. district agriculturists or government extension programs) had higher technology scores than did those who named less expert sources of ideas (other farmers or themselves) or used no new ideas. The strong positive relationships between technology score and information contact sources appear reasonable, since an individual must become

aware of a new idea before its adoption can occur. Those respondents who had little informational contact with outsiders would not be exposed to as many possible innovations and thus, chances of adoption would be lower.

Respondent attitudes--Correlation coefficients between respondent attitudes and the technology score varied widely (Table 6). Of the variables included in respondent attitudes, innovation proneness showed the greatest relationship to the technology score with correlation of 0.555. Those respondents who were more prone to innovations (placed an intrinsic value on learning about new ideas) were more likely to be utilizing a greater number of recommended practices than were those with low innovation proneness scores (i.e. preferred traditional methods). Economic motivation, self appraisal of progressiveness, rate of change evaluation, and attitude toward the use of credit scores were also significantly correlated to the technology score at the 5 percent level. Respondents who were more economically motivated or considered themselves to be making frequent changes achieved higher technology scores than the slower adopter or the less economically motivated. The less progressive and those with a negative attitude toward the use of credit were utilizing lower levels of technology than were those who felt one should "use all the credit he can get" or were "one of the first" to try new ideas. Those respondents who felt the best farmers in their area were always trying new ideas had higher technology scores than those who felt the best farmers were only occasionally

Table 6

SIMPLE CORRELATION COEFFICIENTS BETWEEN TECHNOLOGY SCORE AND RESPONDENT ATTITUDES

Attitude	r-value	t-value	level of significance
Innovation proneness score	0.555	7.04	0.5%
Primary group preference score	0.125	1.11	50%
Rural life preference score	-0.060	-0.528	-
Economic motivation score	0.393	4.08	0.5%
Best farmers in area score	0.200	1.83	10%
Self appraisal of progressiveness score	0.304	2.94	0.5%
Evaluation of rate of change	0.307	2.97	0.5%
Attitude toward use of credit	0.403	4.22	0.5%
Availability of expansion capital	0.106	0.941	50%
Risk and uncertainty score	0.090	0.796	50%

using new ideas or using only proven practices. The primary group preference, availability of expansion capital, and risk and uncertainty scores were significant only at the 50 percent level. Thus only a low level of confidence (50 percent) can be placed in the correlation coefficients and their relationship cannot be measured with any degree of reliability. No relationship was evident between the technology and rural life preference scores.

It can be seen that those respondents who reported membership in a religious denomination were likely to have lower technology scores than those who stated no denominational affiliations (Table 7).

Table 7

DIFFERENCES IN TECHNOLOGY SCORES BETWEEN RESPONDENTS REPORTING RELIGIOUS AFFILIATION AND THOSE REPORTING NO AFFILIATION

Denominational Affiliation	Technology score deviation from no affiliation	t-value	level of significance
Lutheran	-19.0%	-2.58	2.5%
Roman or Creek Catholic	-15.7%	-2.11	5%
United or Anglican	-12.0%	-1.74	10%
Baptist or Pentecostal	- 9.88%	-1.18	25%
"Protestant"	- 5.21%	-0.527	-

Note: Technology scores of respondents with no affiliation averaged 56.8%.

Religious denominational affiliation appears to significantly lower the level of technology utilized by a respondent. There was no statistical difference in technology utilization between those respondents who simply stated "Protestant" and those who indicated no religious affiliation. It can be concluded that, in this study, membership in a religious denomination is significantly related to a lower level of technology utilization by a respondent.

Multiple Linear Regression Equation

A multiple linear regression equation was calculated by the standard least-squares method which related independent variables to the technology score. The variables selected for the equation were those which provided the highest level of explanation of variation, whose beta coefficients were significant at a minimum of 2.5 percent and were among the statistically significant characteristics discussed above. The resulting equation (Table 8) included four independent variables to explain technology scores: (1) innovation proneness score, (2) credit attitude score, (3) livestock dummy variable, and (4) the best source of ideas score.

The four variables resulted in explanation of 47.49 percent of the variation in the technology score. Assuming normal distributions, the observed value of the technology score will lie within $\pm$ 13.45 percent, of the predicted score about 67 percent of the time. The F-value of 16.50 significantly exceeds the critical value of 4.04 at the 1 percent level of significance for 3 degrees of freedom in the numerator and 77 in the denominator. Therefore, the equation as a whole does represent the true relationships between the variables.

If a farmer's attitude toward innovation proneness can be increased by 1 point on the -12 to +12 scale,[1] he would, according to the results in Table 8, be willing

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[1] Murray A. Straus, op. cit., pp. 28-29.

Table 8

MULTIPLE LINEAR REGRESSION EQUATION FOR PREDICTION OF

TECHNOLOGY SCORE: COEFFICIENTS AND TEST STATISTICS

Variable	Beta Coefficient	Standard error of beta	t-statistic	Level of significance	Contribution to total R^2
intercept	25.80	-	-	-	-
deviations from the mean (2.5) innovation proneness score	1.64	0.455	3.62	0.5%	30.79%
deviations from the mean (4.15) attitude toward credit use score	2.12	0.886	2.39	2.5%	7.35%
deviations from the mean (0.141) No. livestock dummy variable	-12.8	4.44	-2.88	1.0%	5.39%
deviations from the mean (5.06) source of ideas score	1.54	0.658	2.35	2.5%	3.96%
Coefficient of determination	.4749				
Standard error of estimate	13.45				
F-value	16.50				

to utilize 1.64 percent more of the recommended management practices than before. A change in his attitude requires a change in his intrinsic valuation of keeping up with the latest technological innovations. Changing human attitudes toward new ideas is difficult. However, this appears necessary if increased use of new farming innovations is to occur.

A change of 1 position on the 7-stage attitude toward credit scale resulted in a change of 2.12 percent in a respondent's technology score. As a respondent's attitude changes from the hard line "use no credit at all," toward the more progressive "use all you can get," his corresponding level of technology utilization tends to increase substantially.

The presence or absence of livestock on a respondent's farm provided a statistically significant indication of his level of technology utilization. A respondent without livestock was likely to have a technology score which was 12.8 percent lower than one with livestock on his farm. Thus the respondents with livestock were following a greater proportion of the applicable recommended farming practices than those without livestock. This project was not designed to investigate the motivational behavior behind a respondent's decision such as whether or not to have a livestock operation on his farm, therefore the scope of conclusions which can be drawn is narrow.

A respondent's evaluation of the best source of ideas for his farm is also significant in the regression

equation explaining technology utilization levels. If he felt his best source of ideas was 1 step more authoritative on the 9-point scale, which ranges from "don't use any new ideas" to the authoritative "district agriculturist" source, he would likely be utilizing 1.54 percent more of the recommendations disseminated by the extension branch. The reason for this relationship may be that those respondents who place value in extension sources of information are receiving more accurate and up-to-date information. Those who rely on their "own experience" or "don't use any new ideas" are not utilizing the latest recommended farming practices in their operations. The effect of placing relevance on professional sources of ideas is the increased exposure to new ideas and thus the adoption of more ideas, leading to increased importance being placed on the sources, etc.,---a supportive cycle.

Statistical qualification--The failure to obtain a statistically significant relationship between a specific variable and the technology score does not necessitate the acceptance of the null hypothesis. It only indicates that the data utilized did not confirm the theoretical or expected relationship. In some of these cases, additional data or further research might result in rejection of the null hypothesis.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary of the Investigations

The typical respondent was utilizing approximately two-thirds of the recommended technology included in the study. He was a healthy 46-year-old with 19 years of farming experience. After growing up on a farm, he worked at an unskilled job before entering farming. He had slightly over 8 years of education; his wife had almost 10 years. Both husband and wife had ancestors from the British Isles and were associated with either the Anglican or the United Churches.

The average respondent farmed 460 acres, 363 of which he owned and 97 of which he rented. Although his total assets were over $44,000, he had debts of about $5,000, resulting in a net worth of over $39,000. The majority of the respondents had gross incomes of less than $5,000 per year but had less than $2,000 left after paying expenses for investment in new ideas on the farm.

The typical respondent reported that he was slow moving, and not progressive and that he did not change his farm operations regularly. He exhibited a favorable but conservative attitude toward credit and felt that just about the right amount of money necessary for his expansion was available to him. He was not overly concerned with risks of crop losses and felt the best farmers in the areas were the ones who sometimes used new ideas. He considered himself

to be the best source of farming ideas, even though he subscribed regularly to approximately four agricultural papers. He reported little contact with extension personnel or organizations,either with the district agriculturist or other representatives. He tended to prefer the characteristics of rural life and primary group contacts to the urban situation. He exhibited low economic motiviation, but might adopt new innovations for other non-economic reasons.

The typical respondent was utilizing between 30 and 40 percent of the recommended fertilizer application for grain but was not using any fertilizer at all on his hay crops. If he did use fertilizer on hay, he did so at about two-thirds of the recommended application rate. He was, however, adhering to the rotation recommendations for the area. He was employing between 50 and 70 percent of the included livestock management practices, but only 30 to 40 percent of the record keeping, soil testing, and herbicide use practices recommended for the area. On the whole, the typical respondent was utilizing between 50 and 60 percent of the farming recommendations included in this survey.

Extent of Hypothesis Substantiation

Certain characteristics expected to exert an important influence on the respondents' levels of technology use were found to have no significant effect. The inability to reject the null hypothesis does not necessitate its acceptance. It only points toward the necessity for more

research to re test the hypothesis. It may be possible after a number of tests to conclude that there is no relationship between the variables. Such a conclusion from the present results would, however, be premature.

Relationships statistically different from 0 at the 10 percent level of significance were found for several variables. The variables significantly correlated with technology score were: (1) respondent's ethnic backgroumd (2) respondent's wife's education level, (3) farm size, (4) acres owned, (5) total assets, (6) total debt, (7) net worth, (8) gross income scale, (9) reinvestment income scale, (10) district agriculturist contact score, (11) other extension contact score, (12) number of agricultural papers in the home, (13) best source of ideas score, (14) innovation proneness score, (15) economic motivation score, (16) best farmers in the areas score, (17) self appraisal of progressiveness score, (18) evaluation of rate of change, (19) attitude toward use of credit, and (20) respondent's religious denomination.

Using only 4 variables, it was possible to explain 47.49 percent of the variation in the technology score. The four variables are: (1) innovation proneness score, (2) attitude toward use of credit, (3) "no livestock" dummy variable, and (4) source of ideas score. The coefficients of these variables are all significantly different from 0 at the 2.5 percent level.

The hypothesis of this study that variation in certain characteristics among farmers is related to

variation in the levels of technology utilized by these farmers has been substantiated. Although not all of the variables originally included confirmed the original hypothesis, a large number (21) of them did.

Recommendations and Implications

The most important factor measured that influenced level of technology utilization was the respondent's proneness to innovation. Those respondents who valued learning new ideas and putting them to work on their own farms were more likely to utilize a large number of the recommended practices for the survey area. The results of this study imply that a program leading to a change in a farmer's attitude toward innovations would likely lead to his more rapid acceptance of technology.

Improving a farmer's attitude toward the use of credit could also have a positive effect on the amount of technology he utilizes. A time of high interest rates for credit would probably have a dampening effect on the rate of adoption of technology by farmers, especially those who are near the borderline in their willingness to utilize credit for farm growth.

Farmers without livestock probably have personal reasons for maintaining no livestock enterprise; however, if they could be persuaded to begin livestock operations, their levels of utilization of recommended management practices would likely increase. It may be that the absence of livestock is a corollary of other

characteristics undetermined in this study. Personal preference for working with animals or a dislike of animals could quite conceivably influence the decision as to whether or not to keep livestock on a farm.

A respondent whose attitude toward the best source of ideas for his farm could be shifted toward more expert sources such as extension bulletins and extension personnel would probably increase his use of new ideas. The reason for this relationship may be that if he feels extension resources provide a good source of ideas, he will tend to have more contact with this source and also to place more weight on the advice he receives.

The relationship between economic characteristics and level of technology utilization also has policy implications. The larger farmers are more progressive; the smaller farmers tend to be later adopters and utilize less technology. If this trend persists and if the recommended technology increases the net profits of the firm, it can be concluded that the gap between the large and small farmers will tend to widen rather than narrow. Understanding the reasons for the correlation between size and technology utilization is not as important to the policy formulators as is acknowledging its occurence and then working to minimize the deleterious effects. A small farmer utilizing less technology than a large operator would incur higher costs of production resulting in lower per unit profits on fewer units. The differential would probably result in a smaller base from which to grow or

expand and also in a lower standard of living for the small farmer's family.

The main characteristics of farmers that are related to the use of technology and that can be influenced by an extension worker are attitudes and the amount of contact. Failure to adopt innovations may partially stem from a lack of exposure to new ideas or from a lack of expertise on the part of those introducing these ideas. Increased exposure through increased contact with extension agencies and improvement of attitudes toward new ideas appear to be a direction to follow in the effort to increase the level of technology utilization by farmers.

Any application of the findings of this survey to other regions in Alberta or beyond must be tempered by the recognition of the peculiarities of the survey area. Because the study region has been farmed for a comparatively short period of time in relation to the earlier settled prairie lands, the results of this study may be somewhat biased. The necessity for specific soil management practices may also limit the applicability of the findings. Nevertheless, most of the relationships appearing in this study would also probably be found in farming areas outside the grey wooded soil zone.

Directions for Further Investigation

Suggestions for further research arise from the conclusions of this study. Studies of the relationship between the selected farmer characteristics and the rate of

adoption should be pursued. In all likelihood, the number of practices considered should be limited. The time of adoption relative to the respondent's farming experience, should be considered as well.

This study could also be repeated over a wider area to check the applicability of observations made on grey wooded soil in 1968 to other regions, conditions, and times.

The results of this study indicate the importance of attitudes in the adoption of innovations by farmers. Further research could be undertaken to determine the motivational factors which influence an individual farmer's attitude toward such significant characteristics as credit, the absence or presence of livestock, and innovation proneness. Research of a more psychological nature could provide a basis from which to develop programs designed to alter a farmer's attitudes and, thus, his acceptance of innovations.

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APPENDICES

APPENDIX I

TECHNOLOGY RECOMMENDATIONS AND SCORE CALCULATIONS

Fertilizer recommendations--The fertilizer application recommendations for Breton Loam Grey Wooded Soil in the spring of 1968 in pounds per acre appears in Table A.

Table A

FERTILIZER RECOMMENDATIONS

Fertilizer	Grain on Stubble	Hay
Nitrogen (N)	40 lbs. per acre	25 lbs. per acre
Phosphate (P_2O_5)	25 " " "	10 " " "
Sulphur (S)	10 " " "	12.5" " "

Source: Telephone Interview with D. H. Laverty, Alberta Provincial Soil and Feed Testing Laboratory, Oct. 10, 1968.

Fertilizer score calculations--The ratio of the actual application rate compared to the recommended rate was calculated. If this ratio was greater than one,(i.e. if the actual application rate exceeded the recommended rate), the score was corrected by subtracting, one-third of the amount by which the original ratio exceeded one from one. The resulting values for nitrogen, phosphate, and sulphur were averaged to derive a separate score for fertilizer application on grain and on hay. The grain score was

calculated weighting phosphate twice as heavily as sulphur and nitrogen three times as heavily as sulphur. The hay score was weighted with sulphur three times as important as phosphate and nitrogen twice as important as phosphate. The weighted averages represent the relative importance of the nutrients in crop production.

For example, Farmer A, whose application rates were 6.4 lbs. N., 8.0 lbs. P_2O_5, and 5.6 lbs. S, on grain, was assigned a score of 28 percent. The same farmer applied 10.5 lbs. of nitrogen, no phosphate, and 12 lbs. of sulphur per acre on his hay crops. He was assigned a score of 62 percent for his application level relative to the recommendations. Farmer A's scores of 28 percent and 62 percent for fertilizer application on hay and grain were utilized to develop the technology score.

Rotation recommendations--There are several crop rotation recommendations for grey wooded soils. The Alberta Department of Agriculture states that "Forages are essential to the productivity of grey wooded soils."[1] The bulletin also recommends that summerfallow not be used except for control of weeds that cannot be controlled economically by other means. The rotation program recommended is two to three years of legume or legume grass followed by two to three years of grain production.[2]

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[1] Alberta Department of Agriculture, Soil Management in Alberta, Publication 510 (Edmonton: Alberta Department of Agriculture, 1967), p. 10.

[2] Ibid., p. 10.

Rotation scoring--The respondent's performance relative to the "ideal" rotation was scored on the basis of the percentage of hay in his overall crop rotation plan. A respondent reporting between 81 and 100 percent hay was assigned a score of 33 percent. A rotation including from 61 to 80 percent hay was assigned a score of 67 percent. A score of 100 percent was assigned for a rotation which included from 40 to 60 percent hay. Scores of 50 percent and 0 were assigned to crop rotations including 20 to 39 percent hay and 0 to 19 percent respectively. Farmer A was assigned a score of 100 percent for his crop rotation program because he was following the recommendations.

Composite technology score--Respondent replies to questions regarding use of soil testing,[1] weed spray,[2] wild oat spray,[3] and 10 questions concerning recommended record keeping practices[4] were combined to provide the composite score. Replies to these questions were scored 0 for not applicable, 1 for a negative (i.e.no use) and 2 for a positive reply. The values assigned for each of the 13 questions were added together and divided by the number of non-zero responses to yield an average score. To provide

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[1] Alberta Department of Agriculture, Canada Department of Agriculture and University of Alberta, Alberta Farm Guide, p. 24.

[2] Ibid., p. 51.

[3] Ibid., p. 57.

[4] Ibid., pp. 208-216.

a percentage score, the amount by which the average exceeded 1 was multiplied by 100.

Farmer A's average score was 1.7692; thus his percentage score was 1.7692 - 1.0 = 0.7692 out of a possible 1.0, or 76.92 percent. Inclusion of only the non-zero responses to the questions ensured that only the applicable answers were included in the score calculation.

Livestock management score--Recommendations for livestock management included feed testing; use of protein supplement for hogs, feedlot and range beef cattle, and dairy animals; vitamin A supplementing rations for hogs, beef, and dairy animals; breeding program for hogs, beef, and dairy animals,; breeding sows immediately after the weaning of the piglets; and the use of a systemic insecticide to control parasitic insects in cattle.[1] Respondent replies to questions regarding use of the recommendations were scored 0 for not applicable, 1 for a negative and 2 for a positive reply. An average score was calculated using the process outlined above with the composite score providing a livestock management score. As above, the zero scores were omitted so as to not bias the score downwards for a respondent for whom the practice was not applicable. For example, a farmer who had beef and dairy cattle but no hogs was not penalized by the inclusion of hog management practices in his score calculation. Farmer A was not utilizing many livestock management practices, for he received a score of only 20 percent for livestock management.

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[1] Ibid., pp. 127-151.

Final technology score--The scores assigned for fertilizing of grain and hay, crop rotation, composite technology and livestock management were combined to provide a general overall technology score. The arithmetic mean of the five scores was calculated to give the technology score. Averaging Farmer A's scores of 28, 62, 100, 76.92, and 20 percent resulted in a final score of 60.48 percent. This score indicates that he was utilizing approximately 60.48 percent of the recommended practices included in this study. If the respondent had no livestock, the livestock score was omitted from the calculation, leaving the mean of the other three areas.

APPENDIX II

INTERVIEW QUESTIONNAIRE

CONFIDENTIAL

ADOPTION OF TECHNOLOGY STUDY

Department of Agricultural Economics
University of Alberta
Edmonton

_____
Name of respondent

_____
Present Address

_____
Land location

A. Personal factors

1. In what year were you born? _____or
   How old were you on your last birthday?_____

2. What was your parents ethnic or cultural background?
   (1)_____Father
   (2)_____Mother
   What was your wife's parents ethnic or cultural background?
   (1)_____Father
   (2)_____Mother

3. What is your marital status? Single__, married__, widower__, divorced__, other__

4. Do you have any children? No. of boys__
   No. of girls__

5. Are all your children living at home? No. of boys__
   No. of girls__

6. Would you say that your farming activities are limited by the state of your health?
   Not at all__
   Somewhat__
   Considerably__

7. What was your father's occupation?_____

8. Were you raised on a farm? Yes__ No__

9. If yes, where was this farm? Present farm__
In this area__, Other specify_____

10. How long have you been farming?____years, or
in what year did you start farming?_____

11. Did you have any other jobs before you started farming? Yes__ No__
If yes, please list with years in each.

Job	Years

B. Formal education (both husband and wife)

1. What was the last grade completed in school?
Husband_____
Wife_____

2. What other training have you had:

	Type of Training	Years Completed
a) Husband:		
1. Vocational or technical		
2. Other (university, correspondence, etc.)		
b) Wife:		
1. Vocational or technical		
2. Other		

3. Where was your training taken?

	Husband	Wife
Alberta		
Other in Canada, specify		
Other, specify		

C. Economic Factors

1. Would you please give me some information about your farm size?

Acres owned. . . . . .
private, rented, share lease .
cash lease . . . . . .
Total farm size. . . . . .
cultivated acres(as per permit book). . . . . .
unimproved . . . . . .

2. What is the road travel to your farthest field?
more than 10 miles____ 5 to 10 miles ____
2 to 5 miles____ farm in one block_____

3. On your rented land, is the lease renewed:
every year____every two years____five years____

4. How certain are you that you will be able to continue renting this land for the next:

	Quite Certain	Somewhat Certain	Uncertain
3 years	_____	_____	_____
5 years	_____	_____	_____
10 years	_____	_____	_____

5. What are the labor requirements on your farm?
(1) Do you work on the farm full time? Yes__ No__
(2) If No, what type of off-farm work do you do? _____During what season?_____
What proportion of your time do you spend on the farm? _____%

(3) Do you hire any farm labor? Yes__ No__
If yes, how many men?____For what season?____
(4) Do you have any unpaid family labor? (e.g. children, parents) Yes__ No__
If yes, please describe: Relationship_____
No. of months worked/year_____
(5) Do you usually hire custom work done? Yes__ No__, If yes, what kind?_____and how much?_____

6. If you were to sell all your farm land, equipment, livestock, and feed, then pay off all your debts, how much money would you have left? Under $25,000____,$25,000 to $50,000___, $50,000 to $75,000____, $75,000 to $100,000____, $100,000 to $150,000____, over $150,000____

7. What would you say the ratio of your assets to liabilities is: Less than 2__, 2 to 5__, 5 to 10__, 10 to 20__, negligible__

8. What is the normal value of all farm products sold? under $3,000___, 3-5,000___, 5-8,000___, 8-12,000___, 12-20,000___, 20-30,000___, over 30,000___

9. What is your normal (avg. of last 3 years) net income after living costs--i.e., the amount of cash available for re-investment in the farm and new ideas? Less than $2000__, $2,000 to $5,000___, $5,000 to $10,000___, $10,000 to $20,000___, $20,000 and over___

D. Informal education contact

1. Do you have a:

radio	Yes___	No___
television	Yes___	No___
electric power	Yes___	No___
telephone	Yes___	No___

2. Would you please tell me what newspapers and magazines come into your home?

Agricultural oriented	Non-agricultural oriented
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

3. What is the name of the District Agriculturist in your area?_____Don't know_____

4. How far from your farm to his office? ___miles

5. How much contact have you had with him in the past 12 months?
No. of times he visited your farm_____
No. of times you visited his office _____
No. of field days or meetings you attended _____
Do you read his articles in the local paper?
regularly__,sometimes__, seldom__, never__

6. Have you had any other extension contacts in the past 12 months with other governmental sponsored services (eg. University, Breton plots, etc.)?

No. of Contacts	Type	Service
__	_____	_____
__	_____	_____
__	_____	_____

7. Has anyone else (commercial company representatives) visited your farm during the past 12 months to help you with farming?

Who	Company	Type Advice	Visits (No.)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

8. Have you visited any "experts" for assistance with farming in the last 12 months?

Who	Company	Type Advice	Visits (No.)
_____	_____	_____	_____
_____	_____	_____	_____

E. Community Participation

1. We would like to know what organizations you and other members of your family belong to now.

Name of Organization	Specify Family Member	Position			Activity			
		1	2	3	1	2	3	
Church								
Political party								
4-H clubs								
Agri. society								
Council or school board								
Farmers organizations or cooperatives								
Fraternal organizations (Elks, Masons)								
Sports clubs (curling, bowling, etc.)								
Labor or Credit Unions								
Community assoc.								
Women's organizations (spec.)								
Other (spec.)								

Only | Member | Committee Member | Officer | Seldom | Occasional | Regularly

F. Attitudes, Goals, Values, Aspirations

1. Do you seem to be one of the first around here to try new ways on the farm--or do you wait and see?
_____
_____
_____

2. Credit stands in some people's way. How much credit do you think people should use?
_____
_____

3. What grade were you hoping the children would finish in school? and we'd like to know why you feel that way. _____
_____
_____

4. Some people say that it is more important for your family to help harvest the crop than to attend school. Do you:
strongly disagree____
disagree . . . . ____
agree. . . . . ____
strongly agree , ____

5. Do you feel that the best farmers in your area are the ones who: (a) are always trying new ideas___ (b) sometimes try new ideas____(c) use only proven, accepted practices____

6. What's your opinion? Since you've been farming, where do you find is the very best to turn for ideas on running your farm?_____
_____
_____

7. About how often have you made changes since you've been farming -- one every year, or what?
_____
_____

8. How much more land at present prices would you buy for your farm if (a) your farm would be debt free?____acres, (b) if you would have a 75% equity?____acres, (c) 50% equity?____acres, (d) 25% equity____acres

9. On the land you rent, do you prefer a crop share, or cash lease?_____Why?_____
_____

10. Money available for expansion for your farm is: (a) too plentiful____,(b) about right____, (c) too little____

11. When expanding farm size, yield uncertainty is: (a) the biggest problem___,(b) one of the biggest____, (c) an important problem____, (d) easy to cope with ____

12. What is your religious denomination?_____

G. Soil Management

1. Do you use fertilizer on your crop land? Yes__ No__ When did you start to use fertilizer? Year_____

2. If yes, how much fertilizer do you usually apply?

Crop	Land on	Acres	Analysis	Rate lb/ac.	Lbs. N	Lbs. P_2O_5
____	_____	_____	_____	____ _____	___	_____
____	_____	_____	_____	____ _____	___	_____
____	_____	_____	_____	____ _____	___	_____
____	_____	_____	_____	____ _____	___	_____

3. Do you have a crop rotation plan? Yes__No__ In what year did you start to use a rotation plan?____

4. What is the past 5-year history of one of your "average" fields?

Year	Crop
1968	_____
1967	_____
1966	_____
1965	_____
1964	_____

5. Have you ever had your soil tested by a laboratory to assist in determining fertilizer rates? Yes__No__ When did you first have your soil tested? _____

H. Chemical Weed and Pest Control

1. Do you use weed sprays for weed control in your crops? Yes__No__ In what year did you start using weed sprays?_____

2. What proportion of your crops do you usually spray for weeds?____%

3. Do you use wild oat sprays? Yes__No__ In what year did you first use wild oat spray?____

4. What proportion of your wheat did you spray for wild oats this year? 0% - 20%____20%-40%____ 40%-60%____60%-80%____80%-100%____

5. Has there ever been a serious infestation of grasshoppers in this area? Yes__No___ When?___
Have you ever used sprays to control insects?
Yes__No__ When did you first use them?____

6. Have you ever used chemical sprays to control brush growth? Yes__No__ When did you first use it?
_____

I. Record Keeping

1. Do you keep records of your farming operations?
Yes__No__

2.

Do you:	Yes	No
(a) keep cash transaction records	___	___
(b) keep receipts and have accountants do I.T.	___	___
(c) record crop yields	___	___
fertilizer application	___	___
amount grain fed to livestock	___	___
amount roughage fed to livestock	___	___
weight gains of livestock	___	___
feed efficiencies	___	___
(d) use a prepared account book	___	___

3. What is the name of the account book you use?
_____

J. Livestock Management

1. Do you have any livestock on your farm? Yes__ No__
what kind(s)_____

2. Do you normally have extra feed for sale--i.e., do you grow more feed than you can use yourself?
Yes__No__

3. Have you ever had your feed tested by a laboratory to determine what you need for a balanced ration?
Yes__No__ When did you first have it tested?_____

4.

Do you feed protein supplements to your:	Yes	No
(a) Hogs	___	___
(b) feedlot cattle	___	___
(c) beef cows	___	___
(d) dairy cows	___	___

5. When did you first use protein supplements for:

(a) hogs? ____
(b) beef cattle? ____
(c) dairy cattle? ____

6. Do you feed Vitamin A concentrate to your:

	Yes	No
(a) hogs	___	___
(b) beef cattle	___	___
(c) dairy cattle	___	___

7. When did you first feed Vitamin A? _____

8. Do you use a crossbreeding program for your:

	Yes	No
(a) hogs	___	___
(b) beef cattle	___	___
(c) dairy cattle	___	___

9. When did you first intentionally use crossbreeding for your livestock?_____

10. Do you breed your sows immediately after weaning? Yes___No___

11. Have you ever used a systemic insecticide for warble fly control in beef cattle of non-producing dairy animals? Yes__No__ When did you first try this?_____

Worksheet

LABOR USE

Indicate Number of men each month:

Item	J	F	M	A	M	J	J	A	S	O	N	D	Total Months
Operator													
Hired													
Unpaid family													
Totals													

Please decribe the unpaid family labor:

Relationship to Operator	Age
_____	____
_____	____
_____	____
_____	____

Net Worth of Farm (Market Value)

Assets		Liabilities	
Land and Bldg.. . . .	_____	Long term debts. . (mortgates, FCC)	_____
Machinery	_____	Intermediate-term. debt(F.I.L.,machinery	_____
Livestock			
Food and Supplies. . .	_____	Short-term, (bank, operating)	_____
Other personal assets	_____	Other debts.	_____
Other Assets.	_____	Total liabilities. .	_____
Total Assets.	_____	Net worth.	_____

STRAUS RURAL ATTITUDES PROFILE

INSTRUCTIONS

This form contains a number of descriptions of people. These descriptions are grouped in sets of four. Please examine each set and find the one description that is most like you. Then put an "X" between the brackets beside the statement, in the column headed MOST.

Next examine the other three statements in the set and find the one description that is LEAST LIKE YOU; then put an "X" between the brackets beside that statement, in the column headed LEAST.

Here is a sample set:

Most	Least	
( )	( )	Has an excellent appetite
( )	(X)	Gets sick very often
( )	( )	Follows a well-balanced diet
(X)	( )	Doesn't get enough exercise

Suppose that you have examined the four statements in the sample and have decided that, although several of the statements apply to you to some degree, "Doesn't get enough exercise" is MORE LIKE YOU than any of the others. You would place a mark beside that statement in the column headed MOST, as shown in the sample above.

You would then examine the other three statements to decide which one is LEAST LIKE YOU. Suppose that "Gets sick very often" is LESS LIKE YOU than the others. You would place a mark beside the statement in the column headed LEAST, as shown in the sample above.

For every set you should have ONE (and only one) mark in the MOST column, and ONE (and only one) mark in the LEAST column.

In some cases it may be difficult to decide which statements you would mark. Make the best decisions you can. Remember, there are no right or wrong answers. You should mark those statement which MOST NEARLY APPLY TO YOU. Be sure to mark ONE statement as being MOST like you, and ONE statement as being LEAST like you. Please mark every set.

Most	Least	
( )	( )	Feels that farmers have to work too many hours
( )	( )	Feels a family should do things together
( )	( )	Sees little value in a farmer studying agriculture in school
( )	( )	Is a good farm business manager

Most	Least	
( )	( )	New discoveries and changes in farming methods interest him greatly
( )	( )	Dislikes being tied down to chores or irrigating
( )	( )	Likes the fact that farming gives the whole family a chance to help earn the family living
( )	( )	Would rather make $3,000 a year and be free of debt than make $5,000 and be in debt.

Most	Least	
( )	( )	Farming gives him a sense of achievement
( )	( )	Usually discusses farming plans with his wife (or parents)
( )	( )	Believes the old idea that anyone who is ambitious and works hard can get ahead is no longer true
( )	( )	Usually waits to see what results neighbours get before trying out a new farm practice or seed variety.

Most	Least	
( )	( )	Feels that a farmer has to keep learning and trying new things to stay on top
( )	( )	Finds most articles in farm magazines impractical
( )	( )	Feels that the city gives people more new and interesting experiences than does living in the country
( )	( )	Feels that working together with friends and neighbours is the key to success

Most	Least	
( )	( )	Farm life puts too many restrictions on his social activities
( )	( )	Has a hard time finding people of similar interests in the country
( )	( )	Attends field days and farm meetings whenever possible
( )	( )	Believes that the ideal farm is one on which all the work can be done by the farmer and his family

Most	Least	
( )	( )	Thinks it is wrong to charge interest when money is loaned to family members
( )	( )	Has tried out several new farm practices in the last few year
( )	( )	Independence or being your own boss is what he most likes about farming
( )	( )	Good neighbours are one of his biggest assets

Most	Least	
( )	( )	Likes the exercise in the open air and sunshine involved in farming
( )	( )	Gets enjoyment out of learning new ways of doing things
( )	( )	All he wants from his farm is to make a reasonable living for the family
( )	( )	Doesn't really like to exchange work with neighbours

Most	Least	
( )	( )	Security and permanence are what he most wants out of farming
( )	( )	Gets little pleasure out of visiting neighbours
( )	( )	Farming offers a challenge to him
( )	( )	Believes that the traditional ways are the best ways of doing things

Most	Least	
( )	( )	Thinks high school is enough education for a practical man like a farmer
( )	( )	Finds that one of the greatest helps in farming is to keep good records
( )	( )	Tries to participate actively in community activities
( )	( )	Living in a city would give him the opportunity for new and interesting experiences

Most	Least	
( )	( )	Gets great enjoyment out of working with plants or animals
( )	( )	Listens to farm programs to get new ideas and keep up on farming methods
( )	( )	Hates to borrow money even when he knows it is necessary to run the farm properly
( )	( )	Knows only a small proportion of his relatives well
Most	Least	
( )	( )	Seldom makes an annual donation to his church
( )	( )	Would have more fun living in a city than on a farm
( )	( )	Keeps up to date on the latest farming methods
( )	( )	Would rather exchange work with a neighbour than hire things done.

Most	Least	
( )	( )	Seldom discusses farming plans or buying farm equipment with his wife (or parents)
( )	( )	Maximum profit is more important to him than improving the land
( )	( )	Has gotten a number of good ideas from farm magazines
( )	( )	Likes to watch things grow